C-LAB

NOTATOR SL/CREATOR SL

MIDI Sequence/Score Edit Printout Management System
SOFTLINK Multi Application Manager for

ATARI ST SERIES

C-LAB Software

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Dear Notator User,

You are now in possession of NOTATOR 3.1, and we should like to thank you for your on-going vote of confidence in the quality of C-LAB products. To find your way around the disks that come with the update, please read on.

The NOTATOR disk contains the necessary program files with an AUTOLOAD.SON, plus the SOFTLINK Multi Application Manager program for those of you with 2MB or more of RAM. The NOTEPAD opens automatically once NOTATOR has loaded, giving information about the AUTOLOAD.SON. To stop the NOTEPAD automatically opening, delete the exclamation mark in the top lefthand corner and resave the AUTOLOAD.SON.

While the program is loading, you may see some words appear on the screen saying “Kein Virus ...”. This indicates that the disk was immunized by C-LAB, and is telling you that there are no viruses on the disk.

If the NOTATOR disk is damaged and will not load, there is an identical backup disk.

The TUTORIAL disk contains practical examples in the usage of NOTATOR: the BASICS folder has 56 simple exercises and the EXAMPLES folder has 20 tasks for the more advanced. You will find more details in the READ_ME.TXT (double-click it, then click “Show”: to scroll the text press <Return> or <Spacebar>, to quit press <Control-C>)

The DEMOSONG disk contains compositions dedicated to various instruments and shows something of what NOTATOR can do. Please read the NOTEPAD for more details. IMPORTANT! Make sure you save the SysEx contents of your synthesizer, since these demo songs contain SysEx data that will overwrite your device's data when you start the song. For more advanced Users, the REQUEST.SON contains ready-made dump requests for various instruments. TR808.SON allows the Roland TR-808 to be synchronized to NOTATOR/CREATOR via the C-LAB HUMAN TOUCH.

The FONT disk contains a selection of fonts for on-screen text and printing. Examples of usage are in the FONTDEMO.SON (see also the Operating Manual Chapter 13.6).

Your C-LAB team

Dear User,

We are delighted with the interest you go on showing for each new version of CREATOR/NOTATOR we bring you. This Version 3.1 is an exciting one, both for CREATOR and NOTATOR owners, and we trust that its new features and enhancements will be as musically-useful to you as we had fun developing it.

Please read this addendum pages carefully! Then insert them into your CREATOR/NOTATOR ring-binder.

These new pages *replace* the corresponding existing pages. Where there is no existing page to replace, the new page is *added to* the manual at the appropriate page number. For example, a new page 11-23 would replace the old page 23 in Chapter 11.

Chapter 20: "ARRANGE MODE" is completely replaced by the new pages.

We also include a summary of the latest Version 3.1 revisions.

Wishing you all the very best in music with Version 3.1.

Your C-LAB team

Version 3.1, Sequencer:

- The Graphic Arrange Mode (GAM) allows arrangements to be viewed and edited graphically. You can switch at any time between the GAM and the familiar arrange list. The numerous new features GAM include new positioning methods, and chain-specific commands.

- The GAM Scrub Mode allows the arrangement to be audio-cued forwards or backwards by mouse-dragging.

- The pattern window can now display "double patterns" of 32-tracks.

- New mute functions allow all tracks of a pattern to be simultaneously muted/demuted; also Solo Mute and Inverse Mute for easy track management.

- Pattern can now be quickly deleted from within Pattern Overview.

- Arrangements can now be saved to/loaded from disk.

- CREATOR/NOTATOR now support the Fostex MTC-1: remote control of Fostex tape recorders from your favourite sequencer (UNITOR is required).

- Support for the C-LAB Steady Eye VITC synchronizer is built into the software.

Version 3.1, Notation:

- Up to three independent voices of polyphony per stave.

- Tracks in the "mapped drum mode" can now have a percussion clef.

- A one-line percussion stave is now available.

- Enhanced Note Attributes window: disabling of Interpretation/Rest Correction modes on a per-note basis; tie directions; etc.

- "Independent notes" can be positioned anywhere and have a MIDI output. "Graphic notes" without MIDI can also be positioned anywhere; either type can be used for grace notes complete with slashed stem.

- The "Process Note Attributes" function applies attributes eg. enharmonic shifting or staccati/accents to the whole track or just a segment. Conditions and criteria can be set, depending on note position, Channel, length, pitch or velocity.

- Page Preview is enhanced to include the ability to jump straight to a page, plus more.

- Pages of print can be saved to disk as "IMG" files for further editing in DTP programs such as Calamus.

Advice on the operation of the Atari Mega STE computer with CREATOR/NOTATOR

The Mega STE comes with a few files in partition C of the built-in hard disk. Some of these must be deactivated for the successful operation of CREATOR/ NOTATOR, and this is done via the new-style Control Panel that comes with the Mega STE.

The simplest way to deactivate a file is to rename the extension: eg "CPX" in the files WCOLORS.CPX, COLOR.CPX and MACCEL.CPX to, for example, "CPY". You will find these files in the folder called "CPX": to rename, click one of the files and select "Show Info..." in the "File" menu.

After that, open the "AUTO" folder and rename the file called "MACCEL3.PRG" to, for example, "MACCEL3.PRX".

MEGA STE, system settings

Click "Control Panel" in the "Desk" menu. Now double-click the "General Setup" panel and click the word "CPU SPEED". A small flip menu opens containing three possible settings: select "16 MHZ – Cache off".

Now save this new default by clicking the "Save" button in the Control Panel.

Now switch off the computer, wait a few seconds and then start it again.

After these steps, CREATOR or NOTATOR should operate properly on the Mega STE.

CONTENTS

Overview

Table Of Contents

FOREWORD

1. INTRODUCTION

2. FIRST STEPS

3. GENERAL HANDLING

4. DEFINITIONS

5. POSITIONING

6. TRACKS

7. RECORDING

8. TYPES OF EVENT

9. EVENT EDITOR

10. SCORE EDITOR: BASIC FUNCTIONS

11. SCORE DISPLAY

12. SCORE SYMBOLS

13. TEXT/LYRIC FUNCTIONS

14. SCORE PRINTOUT

15. HYPER EDIT

16. MATRIX EDITOR

17. QUANTIZE, GROOVE DESIGN, ADAPTIVE GROOVE

18. COPY, MERGE, INSERT, CUT, DELETE, MOVE, SWAP

19. EVENT-ALTERING FUNCTIONS

20. ARRANGE MODE

21. OVERALL SETTINGS

22. REALTIME MIDI GENERATOR (RMG)

23. REALTIME MIDI FUNCTIONS

24. TRANSFORM

25. TEMPO

26. SYNCHRONIZATION

27. UNITOR and the Other C-LAB PERIPHERALS

28. DISK OPERATIONS

29. SOFT LINK MULTI APPLICATION MANAGER

30. APPENDIX

31. INDEX

Original Foreword, April 1987

MIDI, the Musical Instrument Digital Interface, has, over the past few years, transported us to a different planet, musically-speaking. From its early beginnings in the early eighties to now, there have been huge developments: virtually overnight, music technology and the means to control it have become affordable and easy to use.

In the early days, musicians were happy if they found an extra switch on their home organs; now musicians have become used to finding dozens or even hundreds of parameters, features and options in each new generation of MIDI device. All this is welcome news for the musician and composer, of course, because they want to to be able to develop their musical imagination free from technical constraints. But it is precisely this type of "all-round power" of modern technology that can be a problem for the user, where even simple commands take time to execute.

This danger was taken into account in the design of CREATOR and NOTATOR. They are designed to be:

- simple, quick, and convenient in use, and
- able to carry out any conceiveable task.

These conditions were met by developing features such as the "arrange mode", a function which takes the "pattern chaining" method of drum machines (or C-Lab's early Supertrack sequencer) several stages further, by assembling a song's verses, choruses etc as a list, such as you might write on paper, complete with upbeats belonging to the correct part of the song.

Another important feature of CREATOR and NOTATOR is the priority-controlled multitasking, which allows almost any task to be carried out at any time, such as being able to change quantize or transpose values while in record or playback modes with immediate audible results.

Other unique features such as Musical Quantize II, Play Algorithm or full control over MIDI System Exclusive data will be covered in this manual.

Many thanks to all involved in the production of this music software, and to all those whose feedback has been invaluable.

Gerhard Lengeling

April 1987

Foreword to Version 3.0

More! More powerful, more comprehensive, more convenient! This is how people are describing the sweeping developments that have taken place in CREATOR, NOTATOR and the peripheral hardware devices since CREATOR's inception not all that long ago.

That our original concept was the right one is borne out by the steady, continuous development work on CREATOR and NOTATOR, the wide uses to which the software has been put and its influence on the development of other MIDI software.

As ever, we will be continually working on the concept and development of the software to make the UNIVERSAL SYSTEM ever more relevant to your needs, both because we want you to have the best tools for the job of creating music, and because, it has to be said, we enjoy the work!

Once again, we thank the many musical individuals who have contributed their thoughts and suggestions to the on-going success of CREATOR and NOTATOR, with a special word for all those at C-LAB and other friends for their steady and reliable support.

Gerhard Lengeling
Chris Adam
Rainer Schupp

May 1990

1. Introduction

1. Introduction

1. Thinking of buying CREATOR or NOTATOR?

1.1 What do CREATOR and NOTATOR do?

CREATOR:

- is a music sequencer software program that records MIDI data from any MIDI device, plays it back and saves it to disk.
- allows you to edit and process the MIDI data it has recorded using a number of sophisticated editing tools and functions.
- will help you assemble your music quickly and easily using powerful realtime arrange list functions.
- is a realtime MIDI processor, allowing you to process MIDI data in realtime, without your having to record it first.
- acts as a realtime automated mixer of MIDI data (Volume etc) and as a realtime virtual System Exclusive editor.
- is fully synchronizable to audio and video tape for pre- and post-production at home and in the sound studio.
- is fully synchronizable to realtime incoming MIDI and audio signals: the musician's tempo controls the sequencer.
- much, much more.

NOTATOR:

- includes all the CREATOR features listed above.
- has an additional editing tool: the score editor, that lets you edit the MIDI data in notation on the traditional stave.
- NOTATOR is an all-encompassing MIDI composition and production system which will help you from the time you start working on your first idea to the printing out of your completed score.
- Within just one program you have the complete CREATOR sequencer software combined with a traditional notation capability, complete with a sophisticated printout facility.
- There is no division between MIDI Notes and their display in notation form. The data formats of NOTATOR and CREATOR are identical.
- Printout of full scores (up to 32 voices), with editable Page Preview function; down-loadable fonts; full range of notation symbols; support for dot matrix and laser printers.

1.2 Inventory: check the CREATOR and NOTATOR contents

When you buy CREATOR, the package should contain:

- One ring binder contained within a sleeve
- This manual, packaged in the binder
- The small matchbox-sized security key (called a "dongle") with the grey CREATOR label
- One main CREATOR program disk (possibly with a second duplicate disk)
- A registration card, registering your purchase, to be sent off to your country's C-LAB distributor, allowing him to inform you of upcoming updates etc.

When you buy NOTATOR, the package should contain all the above, with the difference that:

- The dongle will have the purple NOTATOR logo
- The program disk will be NOTATOR
- There will be an additional disk containing NOTATOR Fonts.

1.3 System requirements: summary

CREATOR and NOTATOR:

- support Atari ST computers only. The memory capacity must be 1 Megabyte or more *(see Chapter 1.3.1 below).*
- support double-sided disk drives and hard disk drives only (all ST computers' drives are okay in this respect, except for earlier 520 ST's) *(see Chapter 1.3.1).*
- support medium-resolution colour monitors or televisions, providing a) the computer does, b) you have set the correct "screen option" in the computer's desktop, c) you have no respect for your eyesight: the Atari official high-resolution (monochrome) monitor is best. Note: CREATOR and NOTATOR are not "colour" programs *(see Chapter 1.3.1).*
- NOTATOR supports a large range of printers: *see Chapter 14.8.*

2. How to use this manual

Welcome aboard! Important information is in bold type.

The remainder of the information in normal type contains operating steps relating to the topic in hand and descriptions of its other features.

Information relating to NOTATOR is picked out in red.

An additional aid is the chart of keystroke commands which accompanies this manual, giving an overview of all the things you can do using the computer keyboard.

This manual can be logically read from beginning to end.

If this is the first time you are working with the Atari ST computer, continue reading this Chapter. If you are already familiar with the computer, you can skim through the rest of the Chapter and carry on reading Chapter 2 "First steps".

3. For computer novices

If you are a computer novice ...

... don't panic! You do not need any specialized knowledge of computing, nor of computer-programming languages! You bought this program to allow you to use computer technology without having to learn all the difficult bits; it will transform your computer into a musical sequencer.

A few basic observations on computers: with the right program, they should reduce your workload, save you time and so allow you to concentrate on the important things. Used in the right place at the right time, and in the right way, that is what they do. Yet because the range of capabilities of a computer system is so vast, it pays to think carefully about the use to which the system is to be put. Read on for more help.

English-speakers are particularly fortunate that the "language of technology" is English - little or no explanation is needed for the various terms used.

3.1 Hardware (what you can see and touch)

3.1.1 Computer and mouse

The computer consists of, amongst other things, a "central processor" that does all the high-speed calculations that the program demands of it, and a "Random Access Memory" or "RAM" that holds all the data in a "volatile" state, that is, until the power is switched off. Novices: do not confuse what this "RAM" does, and what a "disk" does (see below). The RAM is the computer's own memory, which lasts only until you switch off. Disks are for permanently storing the contents of the RAM.

Never disconnect the earth wire from any computer equipment.

The Atari ST range includes various models and revisions, all of which are compatible with C-LAB software except for the older 520 ST F or ST FM models whose RAM is too small. (But the memory size of the later 520 ST E, like all ST E models is easily upgradeable using official Atari RAM chips - see your local dealer.) The ST range allows a maximum RAM of 4 Megabytes, with the most popular model being the 1040ST or 1040STE with its 1 Mb RAM.

Every Atari has communications sockets or "ports" such as the MIDI ports that allow messages to flow to/from other devices.

The Atari 1040ST and STE have a built-in keyboard and disk drive, requiring only a mouse and a monitor to be connected at their own ports. The MEGA 2ST and 4ST models have a separate keyboard which connects to the central processing unit or "CPU". The various portable STACY models have a built-in monitor and a "tracker-ball" that can replace the mouse, though a mouse can be added.

The mouse is the small plastic box attached to the computer by a cable - its "tail". As it slides across the desk, a pointer moves across the screen and, when the pointer is in the desired position, a button on the mouse is clicked to send an instruction. It is extremely easy to learn to use, even by the greatest computerphobe!

Any ST-compatible mouse is fine, though most people use the official Atari one. Always use it with a mouse mat (such as C-LAB's!) to keep it clean and running smoothly. Some people use a stand-alone tracker ball which saves on desk space but takes a little getting used to.

Get into the habit of switching the computer on last, after the other devices in your system, and off before them.

You lose the data in the RAM when you switch off or if the power is interrupted in any way. Save the data regularly onto "floppy" disks or onto a "hard disk".

3.1.2 Floppy disk drive (internal)

The disk drive, such as that in the ST computers, transfers the contents of the RAM which the user has created onto floppy disks for permanent storage, or reads the data on a disk (such as NOTATOR's) which programs the computer; it works rather like a tape recorder combined with a record player, in that it encodes or reads the rapidly-spinning magnetic floppy disk via a read/write head. It does not necessarily encode the disk in a logical manner, but rather adopts a random method of reading and writing that uses space (organized in blocks, sectors and tracks if you must know!) efficiently. Always wait until the disk drive light goes out before removing a disk.

3.1.3 Hard disk drive (optional)

The majority of users use the computers' built-in floppy disk drives. The alternative is to add a hard disk drive to your computer system which can make work that much more pleasant as it is much quicker than a floppy disk drive. A hard disk drive works, in principle, the same way as a floppy disk drive, but there are important differences. The disk itself is built into the drive and cannot be removed (though there are "cartridge" drives that offer all the advantages of hard disks but with removeable 45 Mb cartridges, at a price). Reading and writing times are much less than the usual floppy drive, and considerably more can be stored on them - up to 30 or 60-plus times more.

The hard disk needs formatting once when you buy it, and can be "partitioned", which means installing small compartments containing data, each with its own user access, rather than having one huge one which would make retrieval bothersome.

It is not often that people move about with a hard disk because they are thought by many to be inherently delicate. Certainly, the read/write head must be "parked" away from the disk whenever it is moved, either using a software command, or some hard disks auto-park the head on power-off. Hard disks are expensive to buy, very expensive to repair, and important data on the disk should ideally be duplicated onto floppy disks or another hard disk for safety.

For those working intensively at home or in the studio, though, they are very pleasant to use because of their speed. CREATOR and NOTATOR can be loaded onto the hard disk, cutting down the loading times to some 6 seconds.
Do read your hard disk manual very carefully.

3.1.4 Monitor

The official Atari high-resolution monochrome monitor is used by virtually everyone, being relatively easy on the eye over long periods. Never disconnect it from the computer or you will lose all your data. You can, however, turn it off without affecting the computer.

CREATOR and NOTATOR are colour-compatible, which means that they will run on a colour monitor, though they are not intended to be seen in colour. A colour monitor can be run in medium or low resolution modes only (there is no such thing as high resolution colour on the ST), and you must "install" your resolution first on the ST's "desktop" in "Set Preferences" under the "Options" menu.

However, use of a colour monitor (or a television if your ST model has a "modulator") can in no way be recommended since the picture is somewhat distorted and does no justice to the fine graphics of either program, plus the screen "flimmer" is unpleasant after a while.

The STACY monitor, using backlit Liquid Crystal Display (LCD) technology, is easy on the eye, surprisingly clear, but might be too faint in some situations; this computer allows an extra (normal) monitor to be connected.

3.1.5 Laser printers (for NOTATOR)

NOTATOR currently supports the Atari SLM 804 laser printer *(see Chapter 14.7.6)* and the Hewlett-Packard LaserJet 2 and 3 models *(see Chapter 14.8 "Which printer?")*.

3.1.6 Floppy disks

A floppy disk allows you to carry any data about, both program (eg CREATOR) or library data such as your songs (try not to store your music data on the CREATOR or NOTATOR program disks - keep them separate). You should always have between five and ten good quality "branded" disks (Double-Sided, Double-Density 3.5") available for use, **which will first have to be formatted to prepare them to accept data** *(see Chapter 28: "DISK OPERATIONS")*. Do not buy "HD High Density" disks which are not recommended for the Atari and anyway cost a lot.

Disks should be handled carefully: they should never be bent and should be kept away from dirt, dust, liquids and magnetic fields such as loudspeakers or mains cables... but musicians are allowed to handle them! Never remove a disk from the disk drive while the drive light is still on. Songs etc are stored on disk in the form of "Files", which are packets of information with a name which you give them at the time of saving, allowing you to retrieve the files and load them back into the program. During the course of your working, you should get into the habit of regularly saving to disk what you are doing in case a power failure or other interruption to your power supply should erase the data in your RAM - at least you will have a very recent version on disk.

From time to time, make back-up copies onto other disks in case one of the disks has a fault. This may sound over-cautious, but "better safe than sorry" with important data.

By the way, the reason why these disks are called "floppy" is that the disk itself, contained inside the outer casing which you can see and hold, is a thin floppy circular disk.

3.2 Software (the instructions that drive the hardware)

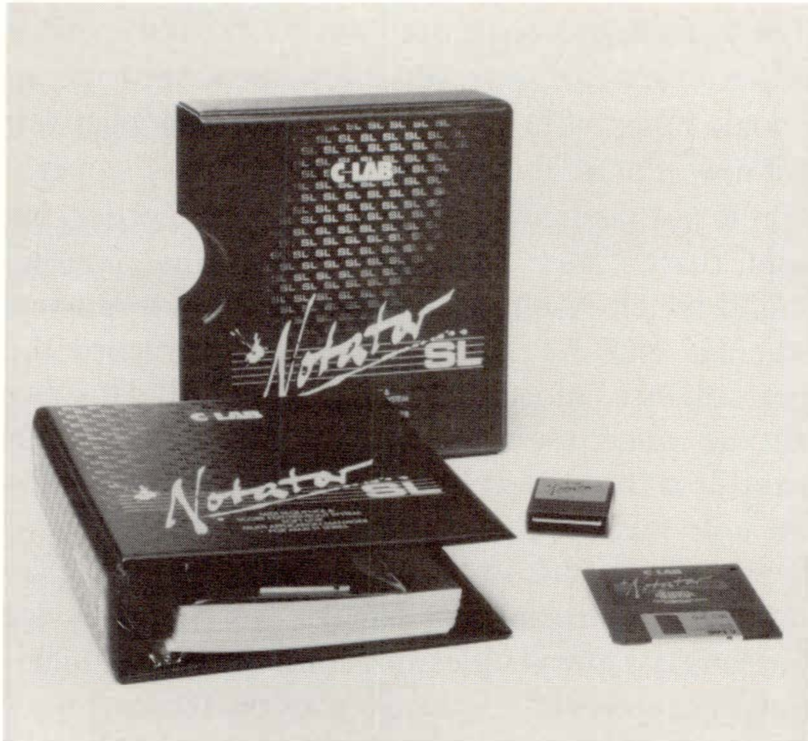
3.2.1 Atari ST operating system (TOS)

The Atari operating system (called "TOS" - The Operating System) is the "foundation" program, built into the Atari ST, which allows programs such as CREATOR to work within the Atari. Without it, the computer would show nothing on the screen and would not allow anything else to run.

The "Graphic Environment Manager" or "GEM" forms part of TOS and controls the "user interface", meaning the "desktop" (what you see when you first switch on - symbols of various kinds arranged around the screen), the mouse pointer, the windows that appear at various times, and various other related items.

The Atari operating manual is the place to find more information on the computer.

3.2.2 Programs



A program is the creative work of one or more programmers; it consists of a long chain of instructions that gives the computer's processor certain abilities and functions, turning it into, say, a word processor, a database, or indeed a hugely powerful MIDI sequencer such as both C-LAB programs. A program is part of the world of "software", the intangible instructions you cannot touch, as opposed to hardware (disks, computers etc) which you can.

The NOTATOR and CREATOR programs remain the intellectual property of the programmers, which is why the programs are protected by a "dongle", the hardware key which slots into the Atari's side *(see Chapter 2 "First steps")*.

3.2.3 Sequencer

Ten years ago, a sequencer was an expensive piece of hardware that gave you a few sequenced monophonic notes. It in no way compares with what you get now. Put at its most basic, a sequencer's operation is not dissimilar to that of a tape recorder, except that a tape recorder records the acoustic sound which results from someone's performance, whereas NOTATOR and CREATOR record the performance information itself as MIDI data, but not the sound: the sound remains within the synthesizer. It is the performance that concerns us - when the note was struck, when it was released, how hard it was struck and so on. The resulting MIDI performance data can then control any MIDI device for limitless possibilities in terms of editing, manipulating, correcting ... the list goes on and on.

And because the sound is always newly-generated live within the synthesizer, by the MIDI performance data, it is always "first generation" with no loss of quality. Not for nothing do we talk about CREATOR and NOTATOR as forming the heart of a "virtual studio".

2. First Steps

2. First Steps

1. Starting the program

1.1 Before switching on

1.1.1 Just NOTATOR or CREATOR (with/without SOFT LINK)

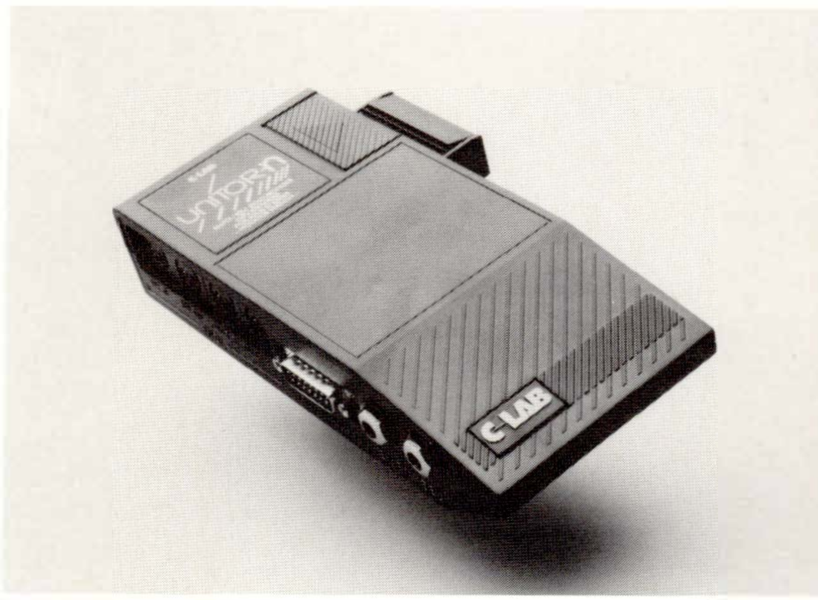
Before switching the computer on, insert the special little cartridge that came with your program, label face-up, into the "ROM port" on the left side of the computer. This is the all-important "key", known as a "dongle" in computer-speak. It contains no program information, but ensures that only an "official" CREATOR or NOTATOR can be run with the dongle in place. This protects C-LAB from illegal piracy (theft of "intellectual property") and means that C-LAB retains the incentive to develop further software for many years to come for you, the musician. Take every care not to lose the dongle; lose the dongle, and you have lost the program. Its value goes far beyond what it cost to make. We can replace the program disk or exchange a defective dongle without any problem, but you would have to buy a complete new CREATOR or NOTATOR package if you lost your dongle.

The dongle must be very well inserted. Before switching on each time, double check that it is firmly in place.

Never insert or remove the dongle while the computer is on!

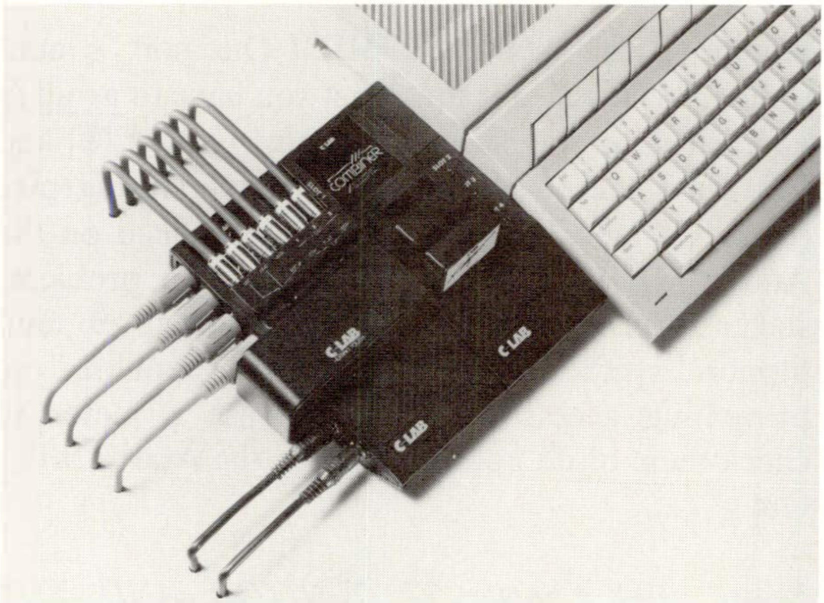
1.1.2 With UNITOR

As a UNITOR-C or UNITOR-N owner, insert it well into the computer's "ROM port" **before switching on.** UNITOR contains the "dongle", so please read carefully the above section - it applies to you! Always place UNITOR on the same surface as the computer (do not let it hang off the computer in mid-air) to ensure no "interface-stress". Ensure the rubber feet are correctly stuck on: 1040 ST owners stick the feet in the recessed wells under the UNITOR, Mega ST owners stick them on the raised platforms. Mega ST owners will need to gently stretch the curly keyboard cable forwards and tuck it under the lefthand edge of the computer before inserting UNITOR, which then keeps the cable in place.



1.1.3 With COMBINER

As a COMBINER owner, insert it well into the computer's "ROM port" and insert your dongle or UNITOR into its side port ("slot 1") **before switching on**. Please read the above UNITOR instructions - these apply to you (apart from the dongle bit). Other keys may be inserted into the remaining three slots, their labels **facing forwards towards you**, but only with the computer switched off.



COMBINER is used as a help when you swap between dongle-based programs (no unplugging and plugging of dongles to be done): here, the "C-LAB" logo on top of the unit is a switch that you press to select the slot (no light showing means slot 1 - NOTATOR or CREATOR - is active); or, if you are running SOFT LINK in an ST of more than 1 Megabyte, COMBINER will automatically swap between the slots according to the partition you select.

Ensure you have read the instructions that come with COMBINER.

1.2 MIDI connections

At its most basic, a simple system starts with the master keyboard's MIDI Out connected by a MIDI cable to the Atari's MIDI In, and the Atari's MIDI Out connected to the keyboard's MIDI In.

Use good quality cables and, even more important, good quality DIN plugs. The best ones are purpose-made for MIDI as they have just three pins (the end pins of a 5-pin DIN plug are not used in MIDI).

Warning! The Atari's ST MIDI Out port is non-standard. This means that what you have to avoid at all costs is a plug whose end pins (called "1" and "3") are soldered across to the neighbouring pins (called "4" and "5"): using this type of lead on the Atari's MIDI Out often leads to weird problems such as sticking notes, drones etc, especially in multitimbral synthesizers. If the plugs are moulded on, preventing access for checking, use a meter to check them or do not use them on the Atari's MIDI Out.

Please read Chapter 27: "UNITOR AND THE OTHER C-LAB PERIPHERALS" on connection tips.

2. After switching on

Insert your program disk into the Atari's drive, then switch on. You should shortly see two "floppy disk" symbols appear on the screen. Double-click symbol "A". A window will open, displaying the contents of the program disk.

At this point, if you intend to run SOFT LINK on your computer (so long as it has more than 1 megabyte of RAM), please read Chapter 29: "SOFT LINK".

(On first buying CREATOR or NOTATOR, you should "size the window" (see the Atari manual) to a size large enough to display all the program files, and use the Atari's "Save Desktop" option (see the Atari manual) to save the window onto your program disk: this speeds up the loading process. The Atari manual contains all you need to know about the computer such as file management, copying, formatting etc. The various files you see on the program disk all do various things within the program and should not be interfered with.)

Now find, then double-click, the program file called "CREATOR.PRG" or "NOTATOR.PRG", depending on which program you own: this loads the program instructions into the computer's RAM from the disk, which will turn the Atari into CREATOR or NOTATOR. Once the program is loaded and the disk drive light is extinguished, remove the program disk and place it somewhere safe - it has done its job for now.

You do not need to know all there is to know about CREATOR or NOTATOR at this stage. You will gradually get to know what you need; some functions will appear to be vital to the way you work, whereas some can be left for later.

The vital functions concern recording, playing and saving/loading your work to/from disk.

If you want to start working with CREATOR/ NOTATOR without intensively studying the whole manual in one go, just carry on.

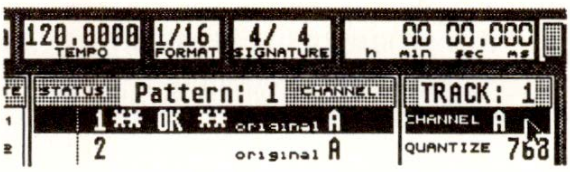
3. The first recording

If you would like some more information about how to handle the mouse, the computer keyboard and the "menu", see Chapter 3 "GENERAL HANDLING".

- You did remember to properly insert the dongle, didn't you!
- Adjust your keyboard to receive on MIDI Channel 1 (and 2, 3, 4 etc if multitimbral). Assign any other devices to the remaining Channels.
- Use the mouse to click "RECORD" on the right of the screen. The 4-beat count-in will start the recording process (turn the monitor's volume control up), the screen reverses shading (white on black) in order to show that recording is taking place.
- Play something - anything - on your MIDI instrument, keeping in time with the metronomic click.

Tip: if you are playing something but you cannot hear your keyboard's sounds, your keyboard may be in MIDI Local mode "off" (which is what we want!), but CREATOR/NOTATOR's MIDI Thru function may be in "Auto-off Channel 1" mode (which we do not want). Please refer to Chapter 21.1 "MIDI Thru" for details.

- Now click the "STOP" icon on the screen. The sequencer stops, the recording is finished and the name "**OK**" should appear on one of the tracks.



If this is not the case, you should check the MIDI connection from the instrument's Out to the computer's In. To show that something is reaching the computer, the display marked "FREE" at the top left of the screen should count down while you are playing the instrument *(see section 4 below).*

- Now click "START". The sequencer will start from the beginning and you should now be able to hear what you have just played. If this is not the case, you should check the MIDI connection from the computer's Out to the instrument's In, and check that the "CHANNEL" value in the track is set to the same MIDI Channel as that of the receiving instrument.

If you have completed these first steps successfully, you can select any one of the other 15 tracks in the current pattern, by mouse clicking the track number, pressing the up/down cursor arrows on the ST keyboard or using the ST "calculator keypad" keys '1' to '6' and 'LeftShift 0' to 'LeftShift 6'. When you have repeated the above steps, the track you recorded first will be heard at the same time.

If you repeat the above steps on other tracks, you will hear the other tracks play while you record and play your current track: this is "multitrack" recording using MIDI.

- "Record-delete": to record in a track again (and simultaneously delete the previous effort), simply select the track by clicking its number, then clicking the Record icon or pressing '*'.

Once you have recorded a few tracks, "START" the sequencer and do a few mouse experiments while it is playing:

- Set "LOOP" values in some of the tracks (eg 4, 8, 16): those tracks will loop around the first few beats equivalent to the LOOP value.
- Change the "TEMPO" value (above the pattern window in the middle of the "information bar"); click on the main bar counter at the righthand end of the information bar and see how you can move around the music; set various "QUANTI-ZE",
  "TRANSPOSE", "VELOCITY" and "DELAY" values in the tracks*(see Chapter 6: "TRACKS")*.
- Assuming that your MIDI system supports more than one MIDI Channel, set different "CHANNEL" values in the tracks (eg a track addressing Channel "A 2" will be received by the instrument set to receive Channel 2 data from the Atari's MIDI Out port).

Before you switch off the computer, the contents of the computer's RAM (not the whole contents, just the part of the RAM that contains your amazing musical efforts) must be saved to disk if you wish to have them available for further work at a later date *(see Chapter 28: "DISK OPERATIONS")*.

- Take a new, empty disk and place it in the disk drive.
- Go to the "File" menu and select "Format Disk". Before clicking "DOUBLE" to start the formatting, do a final check that the disk is not one of your valuable library disks!
  Once formatted, the display will tell you how much space you have on the disk (should be 726 Kilobytes). Click "OK".

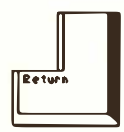
- Now go to the "File" menu again and select "Save SONG" (this is a global save that saves everything you have done). The "File/Item Selector Box" will appear. Type in a name for your "song" of up to eight characters long and click "OK". Your music is now being saved to the disk, after which the display will tell you how much space is left on the disk. Click "OK".

Next time you save a song, you do not have to format: this needs doing only once if you are beginning a virgin disk.

Now read Chapter 6: "TRACKS" if you want to know more about the "track parameter" values you can set for each track in the "TRACK" box on the main page. "QUANTIZE" and "GROOVE" are important parameters as they affect the timing of the performance in the track.

Read Chapters 5: "POSITIONING" and 18: "COPY, MERGE ...etc" to find out more about recording and playback.

To find out more about editing individual notes and to find the score editor (NOTATOR), press the 'E' key after selecting a track to enter the "event editor" for that track, and refer to Chapter 9: "EVENT EDITOR". Press 'E' again to return to the main page, or press 'Return'.



4. "FREE" display

At the far left of the "information bar" that runs along the top of the screen is a box marked "FREE". It shows, approximately, the free amount of space left in the computer's RAM, expressed in events.

Whenever data is recorded, it removes some of those free events (notes use up two events, one for Note On, one for Note Off). Also, when you play data in without recording, you will see this counter scroll down, indicating that MIDI information is reaching the program: the memory is not being permanently lost, but the events are being stored in a "buffer". As soon as you go into record mode or press Stop, the buffer is emptied and the memory "given back" to you.

You can keep the contents of the buffer - *see Chapter 7.9 "Buffer recording".*

Try not to keep so much information in the program that the "FREE" display shows fewer than about 10,000 events free; the program starts to get a little slower to respond to your commands, and in extreme cases, functions such as "UNDO" will not work. If you regularly use up huge amounts of memory, either revise the way you work (use the arrange mode, looping etc more, and do not keep twenty versions of the same song in the available patterns) or take it as an indication that you should buy a larger computer/more RAM.

3. General Handling

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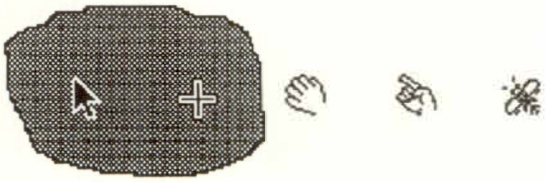
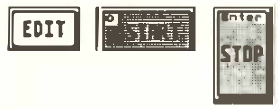
1. Mouse





The mouse moves the "mouse pointer" on the screen. It is the friendly "interface" between you and the program. If desired, it can be bypassed in many cases by direct use of the computer keyboard.

There are many great ways of getting CREATOR to do what you want by using the mouse and/or the ST keyboard (see also the Atari's manual for advice on clicking, dragging etc).

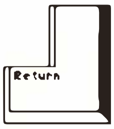
By placing the mouse pointer on something on the screen, virtually every object on the CREATOR or NOTATOR screens is addressable via the mouse either by **clicking** (as in "CYCLE", "START" etc) with one or other of the mouse buttons, **double-clicking** (as in naming a pattern, track etc), **dragging** (as in deleting a track) or **scrolling** (as in altering the Main Bar Counter value).

Click: with the mouse pointer on the desired object, momentarily depress the **left mouse button** - do not hold it. Careful not to move the mouse while you click. If the instruction is to click with the right mouse button, you will be told.

Double-click: with the mouse pointer on the desired object, momentarily depress the left mouse button twice in quick succession. Careful not to move the mouse while you click.

Drag: with the mouse pointer on the desired object, **depress and hold** the left mouse button - do not release it yet. Now move the mouse pointer, which now shows as a hand instead of the usual pointer, to the desired destination. Release the button.

Scroll: see the sections below on ways of altering values.



With some functions, a "dialog box" will appear on the screen where you can select further options. After you have clicked the required option or directly set the value, you can leave the dialog box via the "OK" icon. "Cancel" aborts the function without any alteration. You will notice that one of the icons will often have an enlarged border. This is the "default" icon, which can be selected by pressing 'Return'.

The mouse pointer will sometimes turn into a "busy bee" when the calculations are less than instant.

If you forget your mouse somewhere, the mouse pointer can still be moved by using the cursor arrow keys on the computer keyboard while 'Alternate' is kept depressed. Using the 'Shift' key will allow finer pointer movements, and the mouse buttons are represented by the 'Insert' and 'Clr Home' keys.

1.1 "Scrolling" values with the mouse buttons

"Scrolling" means changing an object such as a time value (the Main Bar Counter, note length in the event list etc) or other "amount" or "multi-choice" value ("QUANTIZE" etc), using the mouse buttons.

Many of these scrollable values are hidden in (what might be described as) "hotspots", little areas on the screen where clicking makes values appear "out of thin air", such as the "track parameters" (eg "TRANSPOSE", "DELAY" etc). **Step-by-step: place the pointer on the value or "hotspot" and click it with single clicks with either mouse button.**

Larger amounts: place the pointer on the value or "hotspot" and depress AND HOLD either mouse button. Adding the other button during the scrolling will speed-up the process.

The direction of scroll depends on the mouse button: the left button represents "up/more", the right button "down/less". Pointing accuracy is important as you are allowed, for example, to scroll the individual columns of a time value.

The meaning of these two buttons can be swapped by pressing 'Shift-Z' simultaneously ("Swap Mouse Buttons").

1.2 'Control' + mouse feature

An alternative way to scroll values which is incredibly useful for some functions in certain situations is the 'Control' + mouse feature:

Point with the mouse pointer (do not click!) at the value you want to change and hold 'Control', and the pointer changes into a cross: sliding the mouse forwards or backwards now increases or decreases the value while 'Control' is kept depressed. Changes are not transmitted while 'Control' is still pressed, only when it is released.

Left-clicking the mouse (while 'Control' is held) will reset the value to "zero/default". This allows you to instantly zero a large value, or to use the feature near the borders of the screen, which would otherwise get in the way: point, press and hold 'Control', move the mouse to the opposite side of the screen, left-click, and now you can alter the values by any amount you like.

Do not confuse 'Control' + mouse with the "Mouse as Slider" function, described below.

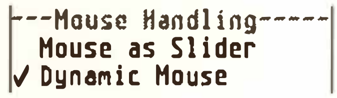
1.3 "Mouse as Slider"

There are two ways of converting the mouse into a "slider" with which to manipulate values. 'Control' + mouse is described above; it uses the 'Control' key.

In the "Flags" menu, "Mouse as Slider" enables the mouse to become a slider even without use of 'Control'. Now you can click and hold a value with <u>either</u> mouse button and move the mouse backwards (decrease) and forwards (increase) without releasing the button. Additionally pressing and holding the other button accelerates the rate of change. Short mouse clicks in/decrement the value in single steps as usual.

There is one important difference between "Mouse as Slider" and 'Control' + mouse: "Mouse as Slider"'s initial button click is active - it changes the value by one step; after that, you move the value by moving the mouse as with 'Control' + mouse. Certain situations are better without this initial click, so, here, use the 'Control' + mouse technique which is smooth from the beginning.

1.4 "Dynamic Mouse"

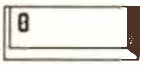


In the "Flags" menu, "Dynamic Mouse" makes mouse movements more efficient: the faster you move the mouse, the further the mouse pointer will move. Moving the mouse slowly will move the mouse pointer in the "normal" manner. Recommended!

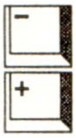
2. Computer keyboard

The computer's keyboard can be used for many activities; for many of these it can replace the mouse (mainly for speed eg some people find it easier to press 'E' to enter or quit the event editor than the equivalent mouse moves), or can be used together with the mouse (such as the 'Control' + mouse feature described above). Most people use a combination of mouse and keyboard to carry out their work - whatever is easiest.

A useful feature is the ability to enter values directly into certain parts of the programs via the calculator keypad.



The numbers must be entered quite quickly one after the other, but take care to avoid starting a number with the '0' key which gives the start command.



The '+' and '-' keys are also useful for changing values; adding 'Shift' speeds up the process.

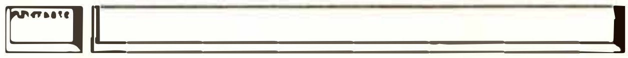
To find out where the calculator keypad or '+' and '-' keys can be used, look for a screen cursor: this either takes the form of a black rectangular "highlighter" that travels about the screen, depending on where you have clicked, or of a faint, flashing surround usually found in the various windows.

There is a clicking sound over the monitor whenever you press a key and the monitor's volume is turned up: many people prefer to turn this noise right off, and to use the "MIDI click" feature as a metronome (see below).

2.1 Macro function

NOTATOR & CREATOR allow you to store and recall series of keystrokes, called "macro routines"; up to a certain point, this includes mouse movements too. Your most common routines involving keys and mouse can be carried out with just one key command, the "macro trigger". The macro function is a means of allowing the user to define his/her "own" set of key commands.

Operation:



1. Press 'Alternate-Spacebar'. The screen inverts (as if recording) to indicate that the program is awaiting further commands.
2. Now press the key or key-combination which is to trigger this particular macro routine in the future.
3. Next, carry out the series of key commands that are to make up this particular macro routine. NOTATOR/CREATOR will record these steps. (Mouse movements and clicks will also be recorded; however, there may be slight differences when the macro is later recalled.)
4. Press 'Alternate-Spacebar' again to cease recording.

Now, whenever the key you defined under (2) above is pressed, the macro routine of key presses and mouse moves you defined under (3) above is carried out.

Example 1: direct jump from the event editor into the RMG page*(Chapter 22).*

- In the event editor, press 'Alternate-Spacebar': you enter "macro record".
- Choose the keystroke that will trigger this macro routine, eg 'RightShift-A'.
- Now press 'E' (to leave the event editor), then 'M' (to enter the RMG).
- To end recording, press 'Alternate-Spacebar'.

From now on, whenever you press 'RightShift-A' in the event editor, the program will jump into the RMG.

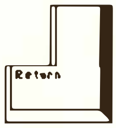
Example 2: automatic track naming.

- Select a track on the main page.
- Press 'Alternate-Spacebar': you enter "macro record".
- Choose the keystroke that will trigger this macro routine, eg 'RightShift-B'.
- Now press 'Shift-Backspace' (to name a track), then 'Esc' (to delete any existing text), then type in the desired name. Finish by pressing 'Return' to close the text window.
- To end recording, press 'Alternate-Spacebar'.

From now on, whenever you press 'Rightshift-B' in the main page, the program will give the current track that name.

Tip: key and mouse commands often have different meanings on the main page and the event editor. You must ensure you are starting your macro routine on the correct page for it to work properly, as the macro routine does not store which page you were on.

The macro function was optimized to take up as little RAM as possible: this is why macro mouse movements may differ from your original movements. Also the computer's operating system does not always react quite the same way to mouse operations. Macro routines which include double-clicks are not quite as reliable as pure keystroke macros. Where possible use the equivalent keystroke, eg 'Return' instead of clicking "OK", and 'Shift-Backspace' instead of double clicking the track for naming, etc. When accessing a menu with the mouse, do not just touch the menu heading in the menu bar with the mouse pointer: left-click as well, to ensure that the menu drops properly.



There is a possibility of confusion with macro routines that include commands which themselves invert the screen shading, such as "Record", "Drop" etc. Always ensure that you begin and end with 'Alternate-Spacebar', and if doing so leaves the screen inverted (black), press 'Return' afterwards to clear it. Do not use the 'Enter' key as part of your macro routine.

Other information:

- To delete a macro routine triggered by a certain keystroke, press 'Alternate-Spacebar', press the keystroke, then press 'Alternate-Spacebar' again.
- Do not use established keystrokes as your macro triggers: find a key or keys that are not used by NOTATOR or CREATOR (we suggest two-key combinations starting with the righthand 'Shift' key, so long as you do not use the calculator pad).
- Be aware that where your macro routine includes switching something on which at present is off, using it when the item is off will turn it on.

- You may have almost as many macro routines as you like: it is wise to keep a personal index to keep track of them (in the Notepad?).
- Macro routines are saved and loaded with your "*.SON" files.
- Tip: to delete all your macro routines at once, use "New Song" in the "File" menu, which initializes the program.

3. Menu

At the top of the screen is the "menu bar" showing the "menu headings" of the various "menu options". As soon as the mouse pointer touches a heading, a menu will pop down containing options you can select by clicking. If none of the options is required, click anywhere outside the menu to cancel it.

Some options act as "latching switches" (eg "Insert mode" in the "Edit" menu) and have a tick to show when active; some act as "momentary switches" and send a command message when clicked (eg "Maximum Volume" in the "MIDI" menu); some allow you to toggle between two choices (eg "Record Cycle Overdub" in the "Flags" menu merges when ticked, but replaces when unticked); some open up a further window for more decisions (eg "Set Capture Parameters" in the "Quantize" menu); some give you access to other parts of the program (eg "Notepad" in the "Options" menu).

4. Definitions

4. Definitions

1. Event

```
1 1 1 1 NOTE  1 E3 64  1 47
```

MIDI is a communications language that tells a receiving device all about a musical performance; it consists of a string of "events" that are instructions sent to a MIDI device telling it what it should be doing at a given moment, eg "play a note", "louder", "add vibrato", etc.

An event represents the smallest unit in the NOTATOR or CREATOR hierarchy of data. Recorded MIDI data takes the form of a list of events with their time positions. There are several types ("STATUS") of events: eg the movement of the modulation wheel is stored in the form of many single "Control 1" events, which describe the position of the wheel at certain points in time; a note consists of a Note On event and a Note Off event with a corresponding note number (pitch) and velocity; etc.

(For the technically-minded: MIDI events usually consist of three "bytes" of information. This is dealt with in a bit more depth in *Chapter 9: "EVENT EDITOR"*.)

2. Track

A "track" in CREATOR and NOTATOR provides space to record any number of notes and other events, and is roughly the MIDI equivalent to a tape recorder track. A track is normally used to record events that belong together, eg a bassline, percussion track or string of volume commands.

A track can contain as many simultaneous notes as you like, can be as long as you like, and can contain the information of up to 16 MIDI Channels at a time if you so wish. Each track is independent and can be processed by the "track parameters", edited and copied quite separately one from the other.

3. Pattern

A "pattern" in CREATOR or NOTATOR is no more/no less than a handy organizational way of collectively processing, editing, copying, generally "manipulating", from 1 to 16 tracks of MIDI music at a time. Think of it as a "handle" on a number of tracks which belong together.

A pattern can be as long or as short as you like (it is, if you think about it, as long or as short as the length of the longest track, though this length is overridable in the arrange list - see below). One of the main uses for a pattern is to collectively move tracks around in the arrange list, where you assemble a song or arrangement (see below). A pattern of tracks can form part of a song (eg verse) or symphony (eg overture), in which case you would use the arrange list to assemble the finished product; on the other hand, a pattern could contain the whole song or symphony within the one pattern.

Any of these 99 patterns can be worked on individually when the arrange mode is "OFF" by selecting the desired pattern number.

In point of fact, there is a limit on the length of a track or pattern of some 1356 bars at the 1/768th note resolution. This lasts about 45 minutes at 120 beats per minute, more than enough for every conceivable situation, and already some 30% more than the MIDI Song Position Pointer allows for.

4. Arrange mode

When the "ARRANGE" icon is clicked to "ON" in the "information bar", it is the arrange mode's "pattern list" that dictates what you will hear when "START" is clicked.

CREATOR and NOTATOR will play patterns in the order in which you have entered them in the list. Think of the arrange mode as being a "sequencer for patterns" within the main sequencer. Each line of the list contains a pattern entry which explains when that pattern should play and for how long. Each pattern in turn contains a collection of tracks which play their events accordingly.

Every pattern in the list is on a different line to allow you to give a name or description to each entry.

Each pattern could represent the various parts of a song (intro, verse, chorus etc), in which case the arrange list would have a series of patterns following each other in one of the four chains a, b, c or d. At the same time, you could have patterns in the other chains containing long tracks running concurrently. The flexibility is huge.

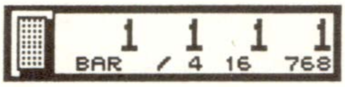
CREATOR and NOTATOR are 64 simultaneous-track sequencers: each arrange chain can contain one pattern of up to 16 tracks at a time. The arrange list allows up to all four chains to run concurrently: hence 4 X 16 = 64 simultaneous tracks.

When the arrange mode is switched off, you can determine which pattern's tracks will be heard by scrolling to the desired pattern number above the pattern window.

5. Positioning

5. Positioning

1. Position and length displays in musical terms



All time and length values throughout NOTATOR and CREATOR are shown as four columns:

1st column:	bar number	eg first bar
2nd column:	beat	eg first quarter note
3rd column:	beat subdivision	eg first 1/16th
4th column:	pulse	eg first 1/768th

The third column's values reflect the setting of the "display format" (see below). The fourth column's values are subdivisions of this display format, and are not really musical units of time, but are very necessary when you have such a high resolution as NOTATOR's or CREATOR's; they represent the smallest unit of time in the programs, so-called clock ticks or "pulses".

Note the difference between a time position and a length display:

Where a display shows a time position, it will show the current time as being, say, "1 2 3 1", which is:

in bar 1
on the second beat
on the third sixteenth of that beat
on the first pulse of that sixteenth.

Where a display shows a musical length, such as a note's or pattern's, it will show the length in absolute terms: so, if a note is exactly four-and-a-half bars long, the display will show "4 2 0 0", which is a length of exactly:

4 bars
2 beats
no sixteenths
no pulses.

These CREATOR/NOTATOR four-column displays act rather like a car's tripmeter: once the pulse column has clocked up the required number of pulses (48 per sixteenth), it starts again from its 1 and the sixteenths column registers 2; when the sixteenths column has clocked up the required number of 1/16ths (4 per beat), it starts again from its 1 and the beats column registers 2 ...etc.

This system means you are never faced with having to work out "how many 1/16ths are 157 pulses?" (answer: 3/16ths and 13 pulses).

Positions before the official first beat (the "downbeat", as it is called in music) are displayed as smaller values than "1 1 1 1", eg "0 3 1 1" (bar "zero", the one before the first bar). Lengths less than a bar show a blank where the bar number normally is (same goes for beat and 1/16ths).

1.1 Current position: the Main Bar Counter

The display at the top right of the screen, at the righthand end of the "information bar", is the "Main Bar Counter". It shows, in musical terms, the current position of the piece of music being played. It consists of the four columns as described above.

The small grey "button" directly to the left of the Main Bar Counter represents a "counter reset" button: click it once to make the Main Bar Counter jump to the first beat of the bar displayed, click it again to reset the counter to "1 1 1 1".

The Main Bar Counter can be scrolled during recording or playback, whereupon the music will jump to the new setting.

1.2 How time signature and display format affect time displays

The second column of any time display (the beat) is affected by the time signature (you can see it in the "information bar" along the top of the screen). The third column (the beat subdivision) is affected by the "display format" (also in the "information bar").

The display format affects the display of time positions and lengths only, and subdivides the beat into musical units, usually 1/16ths. In NOTATOR's score editor, it acts as a "ceiling" or "clamp" on values: if set to "1/16", any length shorter than a 1/16th will be shown as a 1/16th, and the distance between notes cannot be less than 1/16th. This is very useful if the score editor is showing notes that you have recorded in "realtime" from an instrument.

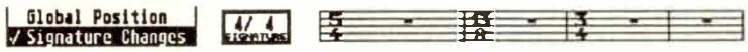
1.3 Time signature

1.3.1 Basic time signature

With "Signature Changes" in the "Edit" menu switched off, the displayed time signature in the "information bar" remains valid for the duration of the whole piece.

You can select the time signature by direct clicking of the "SIGNATURE" display.

1.3.2 Time signature changes



You must switch on "Signature Changes" ("Edit" menu), before you can insert any signature changes.

Switch on "Signature Changes" and scroll the Main Bar Counter to the desired bar position. Ensure it is rounded off to a whole bar (eg "5 1 1 1"), then alter the "SIGNATURE" display in the "information bar" to the desired value.

The new value remains in force until the next time signature. Repeat for each bar where there is a signature change.

NOTATOR users can also enter their changes direct onto the score editor stave (which switches on "Signature Changes" automatically).

Switching off "Signature Changes" ("Edit" menu) deletes all time signature changes (and all NOTATOR's double bar signs).

Time signature changes have a global effect on the whole program and will be reflected in all bar position counters, including the arrange list.

A time signature "belongs to" a bar position. It does not belong to a track or pattern.

You cannot have more than one time signature change in one bar: for example, a time signature change at bar 5 will affect all four patterns in all four arrange chains at bar 5.

Time signature changes will be shown at the correct bars in the event editor when "Global Position" ("Edit" menu) is enabled *(see Chapter 20: "ARRANGE MODE")* and (if you are working in the arrange mode) the arrange mode is switched on; you must ensure that, before going into the event editor , you have clicked the arrange list cursor onto the entry whose tracks you wish to inspect.

Advice: because time signatures belong to a bar position, it requires serious planning ahead, especially if you intend to have more than one or two. Once they are in place, changing your mind about the structure of the piece of music could mean having to delete the first ones and inserting them again in their new positions. This applies whether working in a single long pattern or in the arrange mode.

Ideally, be clear about what structure your music will have before inserting time signature changes, and do not forget to include the song count-in in your calculations. It may help to map out the position of time signature changes on a piece of paper before starting.

If possible, enter the time signature changes before starting to record the music. You may enter time signature changes after you have started, but in the arrange list, you will then have to correct the pattern lengths: introducing time signature changes into a song after you have already assembled the arrange list will always result in pattern length changes (producing unexpected start-bar and pattern delay values): each time you introduce a time signature, you must correct the lengths of the entries throughout the list.

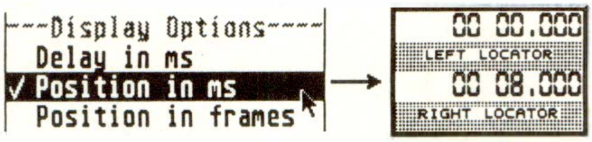
To show you why these lengths change: if you have an entry, say, 4 bars (= 16 beats) long in 4/4 time, changing the time signature to, say, 3/4 means re-deviding the 16 beats by 3, which results in a "Pattern LENGTH" of "5 1 0 0": 5 bars and 1 beat.

Tip 1: because time signature changes belong to specific bar positions, it is not possible to work on a pattern with the arrange mode switched off, give it its time signature changes, then place the pattern somewhere else in the arrange list. The time signature change(s) will remain where they were, they do not move with the pattern, so you must insert the time signature separately.

Tip 2: if, with arrange mode switched off, you give pattern 9 a 3/4 signature in bar 7, then select a different pattern in the pattern window, that too will have the same signature change in the same place, because bar 7 is <u>bar 7 of the program,</u> not of a particular pattern or track.

1.4 Position/length displays in absolute units of time

1.4.1 Position in milliseconds



In the "Flags" menu, "Position in ms" means that any display normally given in bars, beats etc (other than the Main Bar Counter itself, and the "DELAY" track parameter which has its own conversion option) will be displayed in hours, minutes, seconds and milliseconds.

Arrange entry start times will be given in minutes and seconds, but the complete time position to the nearest millisecond may be read under "Pattern DELAY". "Pattern DELAY" is always to be read in conjunction with the start time positions of the individual patterns in the arrange list.

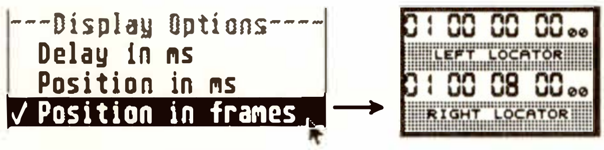
Because every pattern's start time is given an absolute time in minutes and seconds etc, you can organize an arrange list in terms of absolute time, such as setting pattern zero (which stops the sequencer) at the exact time you want the song stopped, eg at 3 minutes 43 seconds.

In the event editor's event list, each event's time position (and the note lengths) will be expressed in hours, minutes etc.

If "Global Position" in the "Edit" menu is disabled, positions are shown relative to the 1 1 1 1 (the "downbeat") of the current pattern. If "Global Position" is enabled, positions are shown relative to the 1 1 1 1 of the arrange list *(see Chapter 20: "ARRANGE MODE".)*

The tempo value in the "information bar" decides the position times. Previous tempo changes are not taken into account in the calculation of positions. If you are in "MIDI Sync mode" where CREATOR or NOTATOR are slaved off an external device, the tempo is dictated by the master device (normally a "Timecode-to-MIDI synchronizer). Most of these devices hold very good time, but do not always exactly run at their displayed tempo (a displayed 120 bpm could be anything from 119.5 bpm to 120.5 bpm). This means that small differences between a strict clock and the displayed time positions in the event list are unavoidable, especially in a long piece of music.

1.4.2 Position in frames



One of the advantages of using "SMPTE Sync" mode (used exclusively with UNITOR) is that it supports the display of time positions in CREATOR and NOTATOR as units of SMPTE time.

In the "Flags" menu, "Position in frames" allows you to display all time positions in terms of fully-editable SMPTE time positions (hours, minutes, frames, bits) <u>when you have created a "Sync Reference" for use with UNITOR.</u>

"No Reference", "too early, "too late" will appear if a bar position is outside the "Sync Reference".

All "Sync Reference" tempo changes are taken into account in events' frame positions *(see Chapter 27: "UNITOR, ...").*

1.5 Elapsed-time counter

Seen in the "information bar", the elapsed-time counter gives the Main Bar Counter's position in terms of hours, minutes, seconds and milliseconds.

Its readout depends on the current tempo but takes no account of tempo changes: if the tempo is altered, the time-elapsed display will give the new elapsed time as if the new tempo had been the original tempo of the piece.

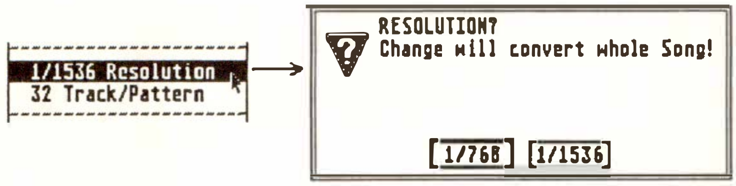
The elapsed-time counter can be directly scrolled.

The counter shows the current SMPTE time whenever SMPTE/EBU timecode is received by UNITOR.

This applies even when the sequencer is stopped.

If a "Sync Reference" with tempo changes is created and "Position in frames" in the "Flags" menu enabled, these tempo changes are reflected in patterns' start times in the arrange list (in the "Pattern DELAY" box).

2. Internal clock resolution: 1/768th or 1/1536th notes



What is this "resolution"?

All digital equipment, including computers, have an "internal clock" that controls the relative timing of every operation in that equipment. The same goes for a digital sequencer like CREATOR/ NOTATOR: these have their own "internal clock" on which is based the timing of the notes etc.

A clock gives out "pulses": everything musical that occurs must be on one of those pulses (you cannot have data between pulses). It follows that the more pulses there are within a given time, the greater the chance that, for instance, the notes that you record into the sequencer will fall exactly on one of those pulses, without the program needing to shift them slightly to the nearest pulses (called "rounding-off"). There is a limit, though, which is that the MIDI protocol puts a ceiling on the timing improvements that a sequencer can make (see below).

The bottom line is that a sequencer with many "pulses per unit of time" will produce far fewer rounding-off "errors" than a low resolution one, and that these errors will be imperceptible.

CREATOR and NOTATOR have taken the unusual step of offering two "resolutions" to suit different situations. They are expressed in terms of "so-and-so-many-notes-per-bar":

The resolution of CREATOR or NOTATOR can be changed between 1/1536th and 1/768th notes via "Resolution" in the "Flags" menu or 'Shift-I'. Altering the resolution will convert the whole song to the new resolution.

Another way used to express this highest resolution of a sequencer, instead of using "n/th notes", is "pulses per quarter note", which mathematically amount to the same thing: so 1/768th notes are 192 ppq, and 1/1536ths are 384 ppq (because a quarter note is a quarter of a bar, so divide 768/1536 by 4!).

The resolution is saved to disk along with other song data (the "*.SON" files) and will be loaded back in with the song. Individual tracks loaded separately can be made to fit with the "Half/Double Speed" function in the "Functions" menu.

Which resolution should you choose?

This depends on each situation, not least because MIDI's rate of transmission limits what might otherwise be achievable.

<u>Whatever the situation, the 1/768th note resolution should be sufficient.</u> This resolution is already very high and very close to the limits of what MIDI is capable of handling: the resolution-related "rounding-off" error that takes place in any (digital) MIDI sequencer is - at 120bpm - imperceptible. To put it into context: a three-note chord *on its own* takes the same amount of MIDI transmit-time as CREATOR/NOTATOR's theoretical "rounding-off" error!

The 1/1536th note resolution can make sense when working with unquantized music at slow tempos (work it out: at 60bpm, using the 1/1536 resolution allows you to retain the same realtime accuracy as 1/768 at 120bpm), or where you need to take advantage of the "DELAY" track parameter offering half the delay value (1.3ms steps at 1/1536, compared with 2.6ms steps at 1/768). Note that the overall number of bars that you have at your disposal is halved to about 650 4/4 bars when using "1/1536".

All this talk about high resolution might appear to be irrelevant if you quantize your music (error-correct its timing), since by doing so, you are deliberately lowering that track's resolution (eg to the nearset 1/16th note etc). But still, a high resolution gives you fine degrees of delay/advance, and remember that the quantization is reversible: you are never stuck with the quantization you have selected.

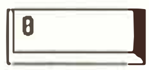
Hint on changing the resolution of existing music: converting a piece into a new resolution can produce rounding-off errors of one 1/768th (1/1536th) note. So before converting a piece, save it to disk, and in any case avoid unnecessary conversions, especially if there is an existing "Sync Reference" where even the smallest errors can be disruptive. You should select the resolution before starting and stick to it!

3. TRUE functions

3.1 TRUE Program, TRUE Volume

"Program change" events (shown as "Program" events in CREATOR/NOTATOR's event list) are events that tell a synthesizer to switch to a particular "Program number" in its structure; this Program represents a particular memory location stored within the synth. By sending a Program event on a particular MIDI Channel, you are asking the synth to switch to the sound filed under that memory location.

These events can be stored in a track, usually at the start of a track (ideally during or before a count-in), and are transmitted to the synth when you press START. But what happens if you decide to start halfway through the song? There is a chance that the synth will be set to the wrong sound(s) for that part. The same goes for MIDI Volume (Control Change 7) commands. What we need is the ability of the program to "look backwards" and transmit the last detected Program/Volume value.



With "TRUE Program" enabled in the "Options" menu, a Start command will transmit the nearest Program event(s) before the Start position: this ensures that the correct Program for each MIDI Channel can be present on starting CREATOR/NOTATOR, wherever you start. *(See also Chapter 20: "ARRANGE MODE", Section 6.2.)*

With "TRUE Volume" enabled in the "MIDI" menu, a Start command will transmit the nearest Volume event(s) before the Start position: this ensures that the correct Volume for each MIDI Channel can be present on starting CREATOR/NOTATOR, wherever you start.

Program and Volume events can be transmitted within the current pattern on all 96 Channels. If there are no Program events before the current position, none is sent.

For any TRUE function to work correctly, the rule is that all events that have a TRUE capability intended for the same MIDI Channel, must lie within the same track, though events of other MIDI Channels/ports may be in other tracks.

The Continue command '.' will not trigger any TRUE function.

Example: if Program events play an important part in your Song, you could enter just one pattern at the top of chain "d" in the arrange list: this pattern is then capable of running throughout the piece (ie "No Limit" Length); all your Program commands could then be contained in the first six tracks, 16 Channels per track, each track being assigned to one of the six ports and each switched to "original CHANNEL".

3.2 TRUE Tempo

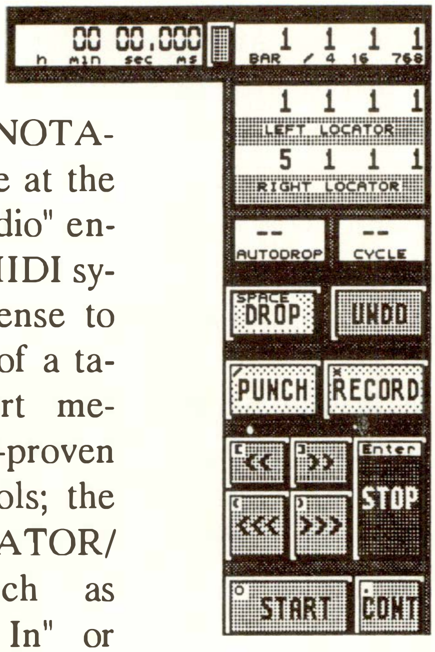
Tempo events P_USER 1 have a "TRUE" capability: provided the recorded tempo changes lie in one track (eg one long track running the length of a Song in, say, chain "d" of the arrange list), TRUE Tempo ensures that the correct tempo is in force:
a) wherever the tape is started in SMPTE mode, or
b) whichever pattern you start from in Arrange mode.

3.3 TRUE P_USER 5-12

The user-definable events P_USER 5-12 transmitted by the RMG function are also TRUE events: where detected, they will be sent on a Start command within the music. *(See also Chapter 22: "RMG", Section 11.)*

4. Transport functions

4.1 Transport controls



Since CREATOR and NOTATOR are designed to be at the centre of a "tapeless studio" environment (so far as a MIDI system goes), it makes sense to simulate the operation of a tape recorder's "transport mechanism" with its well-proven and user-friendly controls; the terms used in CREATOR/ NOTATOR-speak, such as "Start", "Stop", "Drop In" or "Overdub", will be familiar to most musicians (except that the last two can be interpreted different ways - see below).

The functions are controlled by the collection of clickable icons, representing tape recorder-style "transport" controls, on the right of the screen. In small writing on the top left of each icon you can read off the corresponding computer's calculator pad key for that control. For example, '*' in the calculator keypad stands for RECORD.

<u>"START":= large "Zero" key</u> (also available from within the event editor)

Sequencer jumps to its start position (normally Main Bar Counter "1 1 1 1") **and starts.**

With the arrange mode "OFF", the sequencer will jump to and start at bar 1. If there are notes during the count-in (an "upbeat"), ie before bar one , CREATOR/NOTATOR will not play these but will simply store them until you access these notes via the event editor or, in the arrange mode, via the "Upbeat/Cut" function.

With the arrange mode "ON", the sequencer will jump to and start at the beginning of the currently-selected pattern in the arrange list. If the pattern start time does not exactly match a bar beginning (eg if there is an "upbeat" programmed), the start position will be rounded off to the previous bar beginning.

With the CYCLE mode "ON", the sequencer will jump to and start at the position of the left locator.

Selecting START after recording without first pressing STOP is the quickest way of playing back what has just been recorded: the recording will be ended and the notes etc assigned to the currently-selected track.

If CREATOR/NOTATOR are in SMPTE Sync mode (UNITOR) or MIDI Sync mode, the START command will (temporarily) pop them into Internal Sync mode until the STOP command.

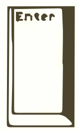
"PAUSE/CONTINUE": = '.' key (also available from within the event editor)

If the sequencer is already stopped, it will continue from the Main Bar Counter's current position.

If the sequencer is running, it will stop and remain at that time position; if you were in record mode, CREATOR/NOTATOR will remain in record mode.

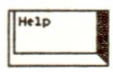
Example: remaining "paused" in the record mode means you can do all sorts of clever things, such as pausing at a given point, selecting a precise bar position (by clicking at the Main Bar Counter) then applying, say, a various mutes to various tracks in the current pattern before carrying on with the recording by pressing the key again (repeat this procedure to demute the tracks).

The PAUSE/CONT command does not trigger TRUE functions.



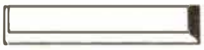
STOP (left-click): = 'Enter' key (also available from within the event editor)

The sequencer will stop. Any recording will be ended and the notes etc will be assigned to the cursored track.



If CREATOR/NOTATOR were already stopped, another stop command will make them jump back to the Main Bar Counter's 1 1 1 1 position; at the same time many synthesizer MIDI functions (pitch wheel, modulation, sustain pedal etc) will be reset (the same effect can be had by double-clicking STOP or pressing the 'Help' key).

Certain (older) synthesizers benefit from a reset on the first STOP command in certain situations, such as in MIDI Sync mode where the tape stops but the synths drone on: keystroke 'Shift-Help' will issue all the resets as soon as the tape stops.



STOP (right-click): = 'Spacebar' key

If the sequencer is in playback mode, this command has no effect.

If the sequencer is in record mode, it will come out of record mode but will continue running without interruption. This command is equivalent to "DROP" - see below.

RECORD-DELETE (left-click): = '*' key (also available from within the event editor)

A recording is started in the current track, including a count-in (you can record during this count-in). Any previously-recorded material on the same track will be deleted (you can retrieve this by using the "UNDO" function).

The same rules apply as with the START command: RECORD makes the sequencer jump to Main Bar Counter position 1 1 1 1 (less the count-in) if the arrange mode is "OFF"; if the arrange mode is "ON", the sequencer will start recording at the beginning of the current track in the current arrange pattern, and the count-in means you will hear the last bar of the previous pattern.

You will remain in record mode until a STOP or START command is received. If "AUTODROP" is active the recording will be ended automatically at the time set by the right locator.

Once you are in record mode with the arrange mode "ON", you remain in that track in that pattern for the duration: you do not "jump" from pattern to pattern as the arrange list scrolls.

If the sequencer is already in SMPTE Sync (UNITOR) or in MIDI Sync modes, the RECORD-DELETE command will simply pop it into record-delete mode without starting it: it's the sync device that issues the START command. A second press or click on RECORD will temporarily revert the sequencer to its usual Internal Sync mode way of working until a STOP command is received.

RECORD-MERGE (right-click): = 'R' key

A recording is started in the current track, including a count-in (you can record during this count-in). Any previously-recorded material on the same track will be kept unharmed, and the new material will be merged in with the original. Otherwise, all the RECORD-DELETE rules apply here too.

Tip: it is normally better practise to record the additional material in a separate track, then merge the tracks afterwards if you wish.

Use this RECORD-MERGE command if you wish to use the "record-cycle" method in a track that already contains data: the original data will not be damaged, whether you are in "cycle-replace" or "cycle-merge" modes.

If the sequencer is already in SMPTE Sync (UNITOR) or in MIDI Sync modes, the RECORD-MERGE command will simply pop it into record-merge mode without starting it ("DROP" has the same effect - see below)**: it's the sync device that issues the START command.** A second press or click on RECORD will temporarily revert the sequencer to its usual Internal Sync mode way of working until a STOP command in received.

"DROP-MERGE": ='Spacebar' key

The DROP command allows entry and exit into recorded tracks at any chosen time without erasing any data that already exists. It is particularly flexible since it issues no START or STOP commands, and is useful for recording data "on-the-fly", whether merging fresh data with existing data, or going into an empty track.

If the sequencer is already in record mode, DROP will make it come out of record mode but will let it continue running without interruption. This command is equivalent to "STOP with right-click" - see above.

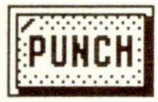
If the sequencer is stopped, DROP will simply put it in record mode WITHOUT the usual additional start command. This is useful for adding eg mutes, RMG snapshots etc at precise Main Bar Counter positions.

If the sequencer is already running in playback mode, DROP will simply pop it into record mode "on-the-fly" without interruption. This is ideal for composing a section of music without interruption, so try it with the "record-cycle" method - see below: you can record a few layers, DROP out, change track and Channel, DROP in, record some more layers, DROP out, listen, try some new sounds etc, all without interrupting the musical flow.

So far, we have seen what "DROP" does on its own. Used on its own, it is called "DROP-MERGE".

When "DROP" is used with prior use of the "PUNCH" command, the meaning of "DROP" changes dramatically. Used in conjunction with "PUNCH", it is called "PUNCH-DROP". "PUNCH-DROP" will always erase any data that already exists, from the punch-in point to the punch-out point.

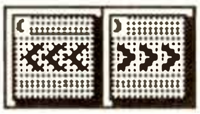
"PUNCH": = '/' key



Using PUNCH on its own in an empty track will make the sequencer go straight into record mode but will not start it: as such, it acts like "DROP-MERGE" above.

If the track already contains data, then PUNCH acts like a security key: it "unlocks" the "PUNCH-DROP" mode, meaning that any use now of the DROP key will delete any material that already exists in the track between the points where you "PUNCH-DROP" in and "PUNCH-DROP" out using the DROP key.

To use "PUNCH-DROP", click or press "PUNCH": the icon will darken to warn you are now in "PUNCH-DROP" mode. Start CREATOR/ NOTATOR (don't use RECORD!), then click or press "DROP" at the desired in and out points. Any necessary Note Off events will be automatically inserted to prevent "droning" where notes were "cut in half" at the punch-in point.



ARRANGE REWIND (< < <): = '(' key in numeric keypad

ARRANGE FORWARD (> > >): = ')' key

Whether or not the arrange mode is "ON", the sequencer will jump to the start of the previous (< < <) or following (> > >) pattern in the arrange list. These commands can be given during recording or playback.

At the same time, the left and right locators are set at the beginning and end time position of the pattern (rounded off to the nearest whole bar) so that if "CYCLE" is enabled, this pattern will cycle round and round.

(Contrast this with use of keys 'F1' and 'F2' which move the arrange cursor up and down the arrange list but only affect what you see and do not move the music.)

BAR REWIND (< <): '[' key

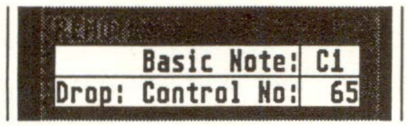
BAR FORWARD (> >): ']' key

These make the Main Bar Counter "spool" from bar-beginning to bar-beginning. These commands can be given during recording or playback which allows you to hear the sequencer "spooling".

The Main Bar Counter itself can be directly mouse-scrolled instead: you can move more quickly within the music but you only hear the end result when the scrolling stops, not while you are scrolling.

4.2 Transport remote via MIDI

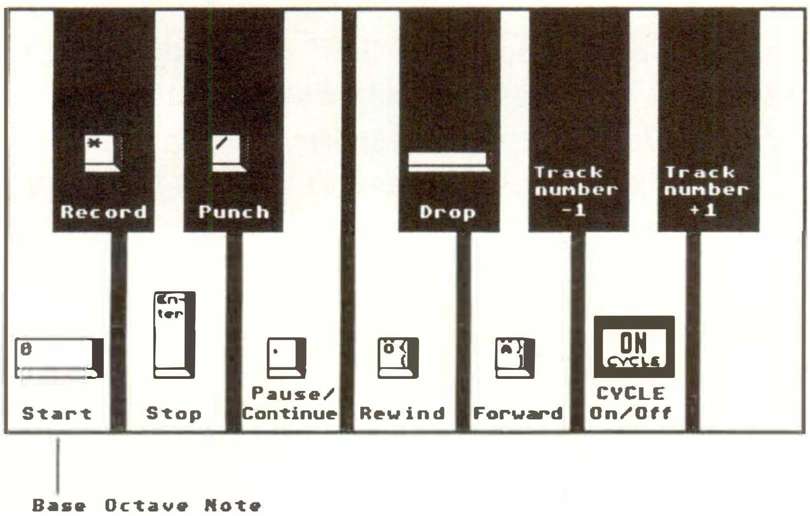
The "Key Remote" option in the "MIDI" menu enables some of CREATOR/NOTATOR's functions to be controlled from a synthesizer keyboard.



This is a useful feature in some situations. The portion of the keyboard being used as the remote control is filtered out of the recording and of the MIDI Thru function: the keys played will not sound (where necessary switch off the synth's "MIDI LOCAL" mode).

The keyboard section being used as the remote controller can be altered in the MIDI Thru window (click the box marked "MIDI THRU" at the bottom of the main page): the sequencer defaults to the "C1" key. Most five-octave synthesizers interpret this as being their bottom "C".

The keys and their respective commands are as follows:



The base key can be changed at will, eg lower on 88-key keyboards or higher when the bass notes need to be recorded. However, it is not unusual for the bass part to be played around the middle part of the keyboard and simultaneously realtime-transposed down one or two octaves by setting, say, "-24" semitones in the "TRANSPOSE" track parameter of any empty track, thanks to CREATOR/ NOTATOR's MIDI Thru function.

In addition, the DROP command can be carried out remotely with a footswitch: CREATOR/ NOTATOR default to MIDI Controller 65 (portamento), though any other Controller is selectable.

5. Cycle mode, Locators und Autolocator

5.1 Left and right locators

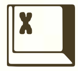
These two position displays, called "locators", represent beginning and end points for various activities; they are called "left" and "right" to mimic a recording tape that has a left and a right end.

A left-click on the words "left" or "right" of the locators will make the sequencer jump to that locator position, whether in stop, playback or record modes.

A right-click on the words "left" or "right" of the locators will transfer the Main Bar Counter position onto that locator, rounded to the nearest whole bar. Press 'Shift' at the same time to prevent the display from being rounded off, so you can set exact cue points "on-the-fly" to the nearest 1/768th or 1/1536th note.

Using the "ARRANGE FORWARD/REWIND" commands (see above) will auto-load the start and end points of the current arrange pattern into the locators.

The 'X' key will also load the start and end points of the current arrange pattern into the locators, with the added feature of automatically switching on the cycle mode.



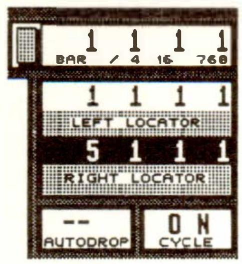
5.2 Autolocator: storing and recalling

The Atari's "Function keys" 'F3' to 'F10' can be used to recall eight combinations of left/right locator positions. The sequencer jumps to the left locator position whether in stop, playback or record modes.

To store each combination, set the desired left/right locations (not the Main Bar Counter itself) and press 'Shift' and one of the eight "Function" keys. Autolocator positions are stored in a ".SON" song file.

The Autolocator is also active from within the event editor.

5.3 Cycle mode



When "CYCLE" is "ON", the section between the left and right locators is constantly repeated (this would be called "shuttling" on a tape recorder). As soon as the right locator position is reached, in playback or record modes, the sequencer jumps immediately back to the left locator position.

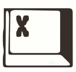
The left locator position always includes its position, whereas the right locator position does not include its position. In other words, a cycle from "1 1 1 1" to "5 1 1 1" allows you to record data on the "1 1 1 1", but the right locator position represents the position at which the cycle goes back, so you can record up to the pulse before "5 1 1 1".

Both locators represent a bar position in the same way as the Main Bar Counter. If for example you only want to hear bars 10 and 11 in order to be able to work on some musical ideas, you would set the left locator to "10 1 1 1", and the right one to "12 1 1 1". As soon as the right locator has been reached, a jump to the left locator will take place. If "TRUE Program" or "TRUE Volume" are enabled, any Program Change or Volume commands will also be repeated.

As well as cycling within a pattern, you can cycle within the arrange list, where your cycle can include many patterns.

The cycle mode exists purely to help you with your work and has nothing to do with assembling the structure of a piece, in the same way that you would not use "tape shuttling" to construct your song in the studio! Repeating sections as part of a composition are done with the use of LOOPs (Chapter 6), the arrange mode (Chapter 20), and the "Segment Copy" and "Multicopy" functions (Chapter 18).

The 'C' key switches CYCLE on and off, both from the main page and from the event editor.



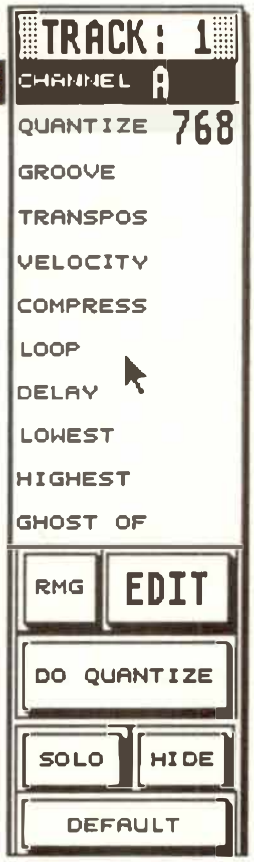
Use of the 'X' key switches CYCLE on and loads the locators with the start and end times of the current pattern's position in the arrange list, rounded-off to the nearest bar. This is of help in, for instance, live situations where a solo can be made longer on the spur of the moment just by hitting 'X' during the first pass of the solo pattern. Switch off CYCLE to carry on as normal.

6. Tracks

6. Tracks

1. General

1.1 What are CREATOR's and NOTATOR's "track parameters"?



The parameters described in this Chapter affect what happens to a whole track. Each track can independently have its own set of parameters. In addition, if these track parameters are applied to any empty track, they are used by CREATOR's and NOTATOR's "MIDI Thru function" to affect whatever you play live.

"Track parameters" are technically described as "playback parameters" since they do not alter the events which are recorded in the computer's memory, but act solely on data **as it flows out of the sequencer in playback mode.** Because they are "playback parameters" that do not alter the events which are recorded in the computer's memory, the effect of these track parameters **cannot be seen in the event editor.**

The two exceptions to this "no alter" rule are the "QUANTIZE" and "GROOVE" parameters: the effect of these track parameters **will be seen in the event editor** as if they were altering the data in the memory, though in reality they are "playback" parameters like all the others. This is done for a reason - see below.

There are many reasons for using "playback" parameters to do a lot of the musical work:

- **quick:** you just have to scroll to the value. It is the value itself that does the work. No need to click in any dialog box or go hunting in the menu bar.
- **flexible:** you are never stuck at any particular setting, but can change whenever you like, even while you are listening to the track.
- **creative:** because it is easy to change the track parameters, you find yourself able to experiment far more to see what CREATOR or NOTATOR have to offer.
- **safe:** at any point, you can return to your original setting since "playback" parameters are "non-destructive".

The track parameter box shows all the track parameters relating to the track selected in the pattern window.

The righthand edge of the pattern window shows the values of the track parameter which has the cursor on it in the track parameter box.

That way you can see virtually *all* the parameters of a track at the same time as *one* parameter for all the tracks.

1.2 Empty, recorded, initialized tracks. MIDI Thru parameters

An "empty" track shows an empty, white space in the STATUS column (down the lefthand edge of the pattern window) and has no name.

A "recorded" track contains at least one event. It shows a black block in the status column and has a name.

An "initialized" track, like an empty track, is empty, but shows a black block in the status column and has a name.

All "empty" tracks receive the same track parameters (Channel, Transpose etc) due to an autocopy feature that ensures that if you set a track parameter in one empty track, it will auto-copy to all the other empty tracks.

The track parameters of any empty track are used by CREATOR/NOTATOR's MIDI Thru function, and so affect what you are playing live.

As soon as a track is recorded or initialized, it is "removed" from the MIDI Thru function. Its track parameters are no longer changed by the auto-copy feature.

Normally, when you play your instrument live, you will be playing on the MIDI Channel which is set in the empty tracks. You might at some point wish to hear the MIDI Channel of a recorded/initialized track. You cannot hear this at the moment since the track is no longer part of the MIDI Thru function (and just placing the track cursor on it will have no effect!). What you must do is place the track cursor on it **and press the computer key which is below the 'Delete' key** (on UK Ataris, this is '#', in the USA '\', in Germany '~'). **This will auto-copy the recorded/initialized track's parameters to all the empty tracks, thereby dictating the MIDI Thru function.**

Example of the MIDI Thru function:

To address an instrument connected to MIDI Out port B and set to receive on Channel 3, select "B 3" in any empty track's CHANNEL parameter: this will divert your master keyboard's incoming data to the new destination, regardless of your keyboard's transmit Channel, which is totally irrelevant in most cases with CREATOR/NOTATOR.

An empty track becomes "recorded" by:

- recording data into it in realtime
- entering events manually into any of the event editor's various editors
- using one of the copy functions to transfer data to the empty track
- using many other functions eg "Extract One Channel" etc

An empty track is initialized by:

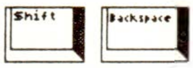
- use of the initializing key command 'Shift-Backspace'

- double-clicking the empty track
- clicking the "EDIT" icon (below the track parameter box) or pressing 'E': this produces a dialog box which asks whether you wish to enter this empty track's event editor. If you click "OK", then re-enter the main page by pressing 'E' again, you have just done what the 'Shift-Backspace' function does much more easily!

"Initializing" allows you to prepare a track's name, MIDI track parameters and (in NOTATOR) display parameters prior to working. Patterns containing initialized tracks can be saved as "*.PAT" files *(see Chapter 28: "DISK OPERATIONS")* and used as future templates, especially useful for orchestral work in NOTATOR. You then gain access to a track's various parameters by use of the "computer key below 'Delete'" method - see above.

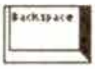
When a recorded or initialized track is erased, its track parameters (and in NOTATOR, its display parameters) will be auto-copied to all the empty tracks.

1.3 Track name



A recorded or initialized track can be named by double-clicking in the space just to the right of the track number or by using 'Shift-Backspace'.

(The 'Esc' key does the same job when the "CHANNEL" track parameter in the track parameter box is NOT highlighted by the cursor, but 'Shift-Backspace is easier.)

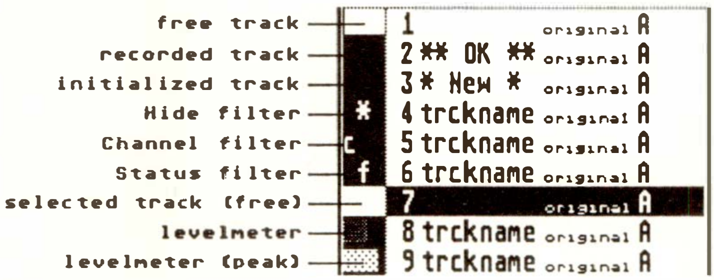


Type in the name, using 'Esc', 'Backspace' or 'Delete' to delete characters and the cursor arrows to move around, then click "OK".

A recorded track first shows "**OK**" as temporary track name after each new realtime recording. Other "recording" and initializing methods (see above) show "*New*" as temporary track name.

The name is purely for your reference: it makes sense to name tracks as you record so you know which track is which.

1.4 Status column in the pattern window



Down the lefthand edge of the pattern window is the STATUS column, giving certain information on each track:

white:	**empty track** *(see 1.2 above)*
black:	**recorded or initialized track** *(see 1.2 above)*
***:**	**HIDE - track will not be heard** *(see 1.5 below)*
f:	**OUTPUT FILTER** *(see 3.10 below)*
c:	**CHANNEL FILTER** *(see 3.11 below)*

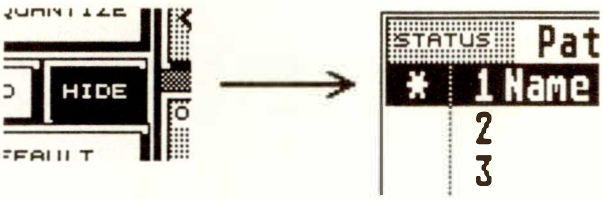
1.4.1 Velocity level/peak meter

The velocities of MIDI notes playing in a track are represented by a little grey beam in the status column that mimics a recording desk's "level meter". This changes to a speckled white beam when notes reach the maximum MIDI velocity value of 127 ("peaking"). There is, of course, no harm done if "peaking" takes place *(see 3.4 below)*.

1.5 Track Hide

Left-click the status column of a track to prevent the data of the entire track from being transmitted: left-click again to un-Hide. A "*" appears in the status column to indicate that the track is "hidden". The HIDE icon to the left of the transport controls can also be clicked, or you can use the 'H' key.

HIDE can be used for "keeping to one side" tracks you have no immediate use for. "Hiding" and "Muting" are two slightly different concepts: "Hiding" a track means that you have to physically "un-Hide" it again if you want to hear it, whereas "Muting" is capable of being automated *(see Chapter 7.1.2. "Screen recording", Chapter 8.7 "Pseudo events", Chapter 20.6.5 "Arrange mutes").*



1.6 Solo

Clicking the "SOLO" icon to the left of the transport controls will solo the cursored track in the pattern window.

Alternatively press 'O'. To solo in the event editor, press 'O'. You can change tracks while in solo mode; also, the same track in each pattern <u>within the same chain</u> of an arrange list will be soloed in turn as the arrange cursor moves.

2. Altering track parameters, singly and globally

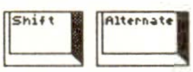
The track parameters can be altered with the left and right mouse buttons, either in the track parameter box or down the righthand edge of the pattern window.

"Quick-step": there is a method of scrolling the values in "musically-useful" steps (see end of this section).

A track parameter can be changed in more than one track at a time:

- **Pressing 'Shift' at the same time as changing a track parameter with the mouse will apply that parameter to all the tracks in the current pattern window (including any empty tracks, and therefore the MIDI Thru function).**

- **Pressing 'Alternate' at the same time as changing a track parameter with the mouse will apply that parameter to all the tracks in the current pattern window which share the same MIDI Channel as the track whose parameter you are changing.**



- **Pressing 'Alternate-Shift' at the same time as changing a track parameter with the mouse will apply that parameter to all the tracks in the whole arrangement (song) which share the same MIDI Channel.**

Example 1: to apply "GROOVE" 16B to all the tracks in the current pattern, hold 'Shift' and change the "GROOVE" parameter in any of the tracks with the mouse.

Example 2: to change all the tracks in the song which are on MIDI Channel A 10 to Channel E 11, hold 'Shift' and 'Alternate' together and change the "CHANNEL" parameter in any of the Channel A 10 tracks with the mouse using either the "mouse-as-slider" function *(Chapter 3.1.3)* or the "'Control' + mouse" function *(Chapter 3.1.2)*.

We strongly advise use of the "'Control'+mouse" feature to change the parameters while holding the appropriate key(s) - it allows you to jump from one value to a distant one, avoiding all that scrolling; release 'Control' before the other keys. This is especially true in Example 2 above, since scrolling through the Channel values would not only take a long time, but would result in "picking up" all the other Channels in the song on the way!

"Quick-step": scrolling track parameters in "musically-useful" steps:

Giving a short click about 1 centimetre from the righthand edge of the track parameter box in the "TRANSPOSE", "LOOP" and "DELAY" parameters will make the values jump in octaves (transpose), bars (loop) and musical fractions (delay).

2.1 "DEFAULT" function for storing track parameters

In the same way that tracks can receive certain track parameters, you can give MIDI Channels their own sets of the same parameters.

A left-click on the "DEFAULT" icon (left of the transport controls) will recall the track parameters for the current MIDI Channel that you have previously stored.

To store certain parameters for a certain MIDI Channel, set your track parameter combination in a track and right-click the DEFAULT icon: this will save the current configuration for the current MIDI Channel. The values can be seen stored in pattern 0: in pattern 0, the 16 "track" numbers refer to the 16 Channels (the port is not taken into account).

If no default setting has been stored for that particular Channel, then the left-click on DEFAULT will reset to "zero" the track parameters.

Example: depending on the way you work, you may like to preset a loop of 32 beats with a certain Groove value and added points of velocity for instant recall in certain MIDI Channels. At any time you can use DEFAULT to recall the preset or not, since simply scrolling up a new Channel does not automatically recall its preset.

Tip: "instant reset" - if no preset is stored for a MIDI Channel, left-clicking DEFAULT clears the track parameter box of values - useful for clearing the MIDI Thru function of unwanted parameters.

3. Track parameters

3.1 Channel

This is where you select the MIDI Out port and MIDI Channel for a track (or for the MIDI Thru function if it's an empty track).

This allows the track or the MIDI Thru function to "talk to" a synthesizer which is set to receive data on the same Channel.

Each event's own MIDI Channel (you can see each event's own personal MIDI Channel in the event list: this value normally shows what Channel the master keyboard was transmitting on at the time the events were recorded) is, as happens with all these "playback" track parameters, overridden by CHANNEL *(compare this with "original" Channel - see below, and MIDI Channel filter, see below).*

The Channel letters refer to the port: "A" is the Atari's own MIDI Out port: there are 16 MIDI Channels (1 - 16) per port.

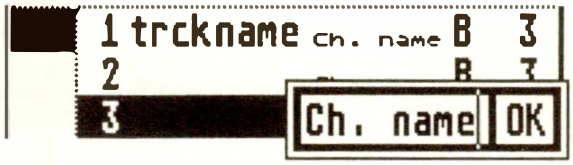
Empty tracks control the MIDI Thru function: to play an instrument set to Channel 3 and connected to port "E", you must set "E 3" in an empty track, so that incoming MIDI data from your keyboard is diverted there in realtime - your keyboard's transmit Channel is irrelevant.

If you find that one of your MIDI devices plays every note that the sequencer puts out, regardless of the MIDI Channel, then you should ensure that it (and all your other devices) is set to "OMNI OFF" mode ("MIDI Mode 3") ... assuming that you want each device to play each musical part separately *(see Chapter 21: "SYSTEM SETTINGS", section 6 "MIDI Mode messages").*

MIDI Thru function: if you set a CHANNEL parameter in an empty track, you can choose which instrument your keyboard will play live.

3.1.1 MIDI Channel name

Each of the 96 MIDI Channels in CREATOR and NOTATOR can be given a name by double-clicking the space in the track just to the left of the Channel number. A name is easier to remember and identify than a number, especially where you are using many Channels.



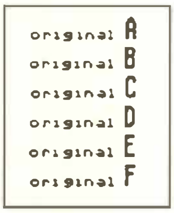
As well as double-clicking to name, you can press the 'Esc' key after having pressed the 'Clr Home' key.

Remember you are naming the Channel, and the Channel is independent of the track, so it does not matter which track you use to enter the Channel name. Normally, the task is done as a preparation, before you start recording the material, and is normally done by scrolling the CHANNEL parameter in an empty track and naming as you go. The Channels need to be named only once, of course, since from now on, selecting a MIDI Channel will automatically display its name.

Type in the name, using 'Esc', 'Backspace' or 'Delete' to delete characters and the cursor arrows to move around, then click "OK".

If you tend to use the same Channels for the same devices when you work, then you may find it useful to name an empty song's Channels with your instruments' names (eg "Yam SY77", "Korg T1" etc) and save this default song to your program disk by calling it "AUTOLOAD.SON", so that it loads automatically with the program from now on *(Chapter 28: "DISK OPERATIONS", section 2.3).* Channel names can also be down-loaded separately from other "*.SON" files *(Chapter 28, section 3 "Load system").*

3.1.2 Channel number "original"



When you select the Channel called "original" (ie no Channel number is displayed), the Channel track parameter will no longer divert the Channels of the events in the track to a specific Channel. So the events' personal Channels, the ones you can see in the event list, dictate which instrument each will go to.

Each MIDI event stored in CREATOR or NOTATOR has a MIDI Channel value. Normally, this is overridden on playback by having a certain Channel value set in the CHANNEL track parameter. Using the "original" setting means that if you have different Channels recorded in a track (up to 16 Channels simultaneously), all 16 MIDI Channels can be played back simultaneously from one track. What's more, the MIDI Channel of each single event can be freely altered in the event list.

"Original" Channel used in any empty track means that the MIDI Thru function will not divert the live data from your keyboard to any particular Channel, but will allow the data through unaltered. This means that your keyboard's transmit Channel dictates what instrument it will play.

3.1.3 MIDI Out ports: 6 times 16 Channels

The MIDI Protocol defines 16 MIDI Channels which can be transmitted simultaneously through one MIDI output. These 16 Channels are often not enough, especially where you are using multitimbral synths in your music setup. (A multitimbral synth is one which can play several different Channels simultaneously, as if it were a collection of different synths.)

By adding EXPORT and/or UNITOR, you are adding up to five more separate, independent ports:

Port A:	**Atari MIDI Out**
Port B,C,D:	**EXPORT**
Port E,F:	**UNITOR**

Read more on EXPORT and UNITOR in Chapter 27.

Do not confuse these outputs with those of a multiway "Thru splitter box" which merely copy the same data to many outputs. EXPORT and UNITOR allow you to address separately up to 16 Channels on each output.

Each track can be set to one of the six outputs. The CHANNEL track parameter defines the output port (A-F) and the Channel (1-16).

There are 96 possible combinations, "A 1" to "A 16", "B 1" to "B 16" etc up to "F 16", allowing up to 96 different musical parts to play. Also, each output has its "original" setting, allowing data to pass through with unchanged Channels.

Tip: do not confuse the output letters A, B, C, D, E, F with the (lower case) arrange chain letters a, b, c, d. There is absolutely no connection between the two.

3.2 Quantize and Groove

These auto-correct the time positions of notes to various extents. *Please read Chapter 17: "QUANTIZE, GROOVE DESIGN, ADAPTIVE GROOVE".*

MIDI Thru function: QUANTIZE and GROOVE have no effect on the MIDI Thru function.

3.3 Transpose

This track parameter transposes data by up to +/- 96 semitones; being a "playback" parameter, its effect will not be seen in the event editor. If it is important to you to be able to see the transposition (especially in NOTATOR's score editor) use the "Normalize" function *(section 4.1 in this Chapter).*

MIDI Thru function: if you set a TRANSPOSE parameter in an empty track, you can transpose your keyboard live as you play.

"Quick-step": scrolling TRANSPOSE track parameter in "musically-useful" steps:

Giving a short click about 1 centimetre from the righthand edge of the track parameter box in the "TRANSPOSE" parameter will make the values jump in octaves.

3.4 Velocity

Many synthesizers will recognize the dynamics of a keyboard player's technique, ie how "hard" or "soft" the keys are struck. The resultant "velocity" value can be used to control various synthesizer functions which are used to simulate the "brightness" or "loudness" of the note's attack or other parameters within the synth.

Increasing or decreasing the track parameter "VELOCITY" value adds to or subtracts from the velocities that already belong to each note of the track.

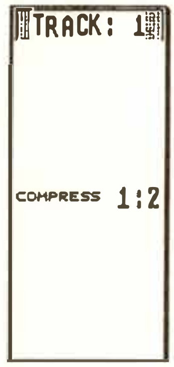
Do not confuse "velocity" with "after touch" or "pressure" information, which is information about what happens to the note after the initial strike *(see Chapter 8.4 "Aftertouch").*

Altering the velocity has an effect on the perceived volume of the notes, though the notes will generally also change timbre (how bright or dull the sound is) as the velocity is changed. Do not confuse "velocity" with "MIDI Volume" information, which is pure volume *(see Chapter 8, section 5 "Control Change" and Chapter 22: "REALTIME MIDI GENERATOR").*

MIDI velocity values go from 1 (minimum) to 127 (maximum). This means that there will come a point (depending on the individual notes' velocity values) beyond which further increases of the VELOCITY value will have no effect. It is at this point that a "limiter" effect comes into force whereby the difference between loud and soft notes becomes less and less as the VELOCITY value is increased. The "level/peak meter" in the status column "peaks" when a note being played has a velocity value of 127.

MIDI Thru function: if you set a VELOCITY parameter in an empty track, you can affect the velocity of your keyboard live as you play.

3.5 Compression



The range of a track's note velocities can be "compressed", "expanded" or "fixed at value 64".

Depending on which mouse button you use, the notes' existing velocities will be compressed in steps 1:2, 1:4, 1:8, so reducing more and more the difference between the highest and lowest velocity values; the next step after 1:8 is "fix", which means that the velocities will all play back at "64" (the halfway value); if you go the opposite way, the expansion values are -1:2 and -1:4, which means you are increasing the difference between high and low velocity values.

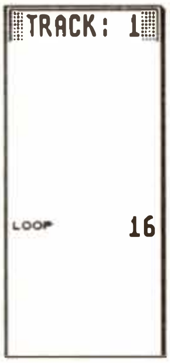
You get the best results by combining the track parameters COMPRESS and VELOCITY, where VELOCITY adds or subtracts from the expanded, compressed or fixed values.

It's simple: to get a track to play back at a uniform maximum velocity, use COMPRESS to "fix" (this gives you a velocity value of 64), then add "62" in VELOCITY: 64+62=126, which is one point less than the maximum. If you add "63", the track's level/peak meter will peak.

Slightly compressing a track by a factor of 1:2 is a good way to smooth out an instrument's velocities without producing a "stiff" result.

MIDI Thru function: if you set a COMPRESS parameter in an empty track, you can compress/ expand or fix the velocity of your keyboard live as you play.

3.6 Loop



A LOOP value is expressed in quarter note beats (depends on time signature). After completing the number of beats selected in LOOP, the track will repeat from the start again.

A loop will always take the pattern's downbeat (1 1 1 1) as its beginning: it cannot start looping anywhere else. A loop will loop *ad infinitum*, until STOP is pressed or the next arrange pattern takes over in the arrange list.

It does not matter whether you have one bar or 1000 bars in a track: if you set a loop value of, say, "4" (4 beats, or one bar), you will only hear the notes in first 4 beats - you have not deleted the other 999, they are just not heard...until you decide to change the loop value.

If you wanted to be able to repeat the contents of the second bar, you cannot use LOOP: use "segment copy with Fill" *(Chapter 18)*, or use segment copy to copy that bar to the start of another track, and then loop it!

LOOP produces a special "Track Loop" event, which you can see in the event list, and where you can edit its time position away from the beat to produce interesting polyrhythmic effects.

MIDI Thru function: LOOP has no effect on the MIDI Thru function.

"Quick-step": scrolling the "LOOP" track parameter in "musically-useful" steps:

Giving a short click about 1 centimetre from the righthand edge of the track parameter box in the "LOOP" parameter will make the values jump in 4, 8, 16, 32 and 64 beat steps.

3.7 Delay/advance

A plus (delay) or minus (advance) value here will move all the events in a track later or earlier.

The values are in terms of 1/768ths (or 1/1536ths depending on the resolution). Values that are musical fractions will be displayed (eg instead of "96", you will see "1/8").

DELAY/ADVANCE is mainly used in small values to improve the "feel" or timing of particular tracks. Different synthesizers have different reaction times (this is NOT a "MIDI timing" problem, but one due to different manufacturers' hardware), so values can be set here either to delay the tracks of quick-reacting synths to match the slower ones, or more usually to advance the tracks of slow-reacting synths to match the quicker ones.

If a track is advanced (and some synths - especially multitimbral ones - are so slow that values of up to "-15" are not uncommon), then you are advancing any note that is on the downbeat (the 1 1 1 1) to a position before the 1 1 1 1, and therefore you may stop hearing it: you must match any advance value with an equivalent "UPBEAT" value in the arrange mode (see Chapter 20, section 6.2).

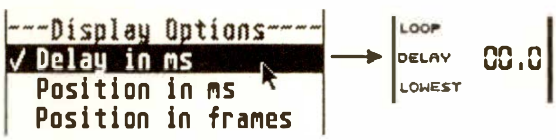
Let us not exaggerate the situation: you may well never need to use DELAY/ADVANCE to improve feel, and anyway, you need to be very sensitive about how you mess with timing!

MIDI Thru function: DELAY/ADVANCE has no effect on the MIDI Thru function.

"Quick-step": scrolling the "DELAY" track parameter in "musically-useful" steps:

Giving a short click about 1 centimetre from the righthand edge of the track parameter box in the "DELAY" parameter will make the values jump in musical fractions.

3.7.1 Delay in milliseconds



"Delay in ms" in the "Flags" menu allows the DELAY/ADVANCE display to be in milliseconds.

The value depends on the current tempo.

Because you can have a large amount of delay/ advance, it is possible to exceed the four decimal places reserved for the display: if ever you get to values of more than 9999 ms (almost ten seconds) or -999 ms (almost one second), you will see a "(+)" or "(-)", to show that the display has run out of space, and that you should switch back to "1/768 notes" to carry on working.

3.8 Lowest/Highest

These two track parameters allow you to "zone" or transmit notes according to their pitches. To hear notes from only C3 upwards, set "C3" in LOWEST and "G8" in HIGHEST. To hear notes below C2 only, leave LOWEST blank (it defaults to the lowest note anyway), and set "C2" in HIGHEST.

MIDI Thru function: if you set LOWEST/ HIGHEST parameters in an empty track, you can zone your keyboard live as you play.

3.9 Ghost of

As soon as a pattern number (small figures) and a track number (normal figures) are entered into an empty track's GHOST OF parameter, this "ghost track" will play the data of the source track, but will do so according to its own track parameters and without actually copying any existing data into itself.

It means that the events of the source track are transmitted twice-over: once out of itself as usual, and once from the ghost track using its own set of track parameters. Because of this, the ghost tracks provide the ideal method of achieving multi-output effects over several Channels such as octave-doubling, arpeggios, delays, chorusing etc.

For reasons of clarity, the QUANTIZE, GROOVE and LOOP parameters of a ghost track are disabled: the source track dictates these parameters. And of course, you cannot advance a ghost track using a negative "DELAY" value since that would put it before its source track!

"GHOST OF" is a type of "track copy", except that ghost tracks have no notes or events of their own: they make direct use of the notes of the already-recorded source track. Two immediate advantages: you save on computer memory; plus, if the master track is edited, or processed in any way which alters data, or is even completely re-recorded, then these alterations will be passed straight on to the ghost track without you having to carry out any further work.

A track can have more than one ghost track.

Normally, you cannot enter the event editor of a ghost track, for the simple reason that there is nothing in the track to edit. However, clicking "EDIT" or pressing 'E' will produce a "dialog box" asking: "Do you want to make a real copy?". This converts the ghost track into a normal track by copying the source track's events into it, but keeping its track parameters. From now on, the track is no longer a ghost.

Ghost example 1: MIDI "doubling".

- In an empty track's GHOST parameter, enter the pattern (little number) and track (big number) of the source track.
  The name "*GHOST*" will appear in the track.
- Now set the desired CHANNEL number in the ghost track, which allows the source track to play two sounds at the same time.
- Add any other parameters you desire in the ghost track.

Ghost example 2: MIDI "zoning".

You wish to have the only the bass notes of a piano track doubled by a bass guitar sound:

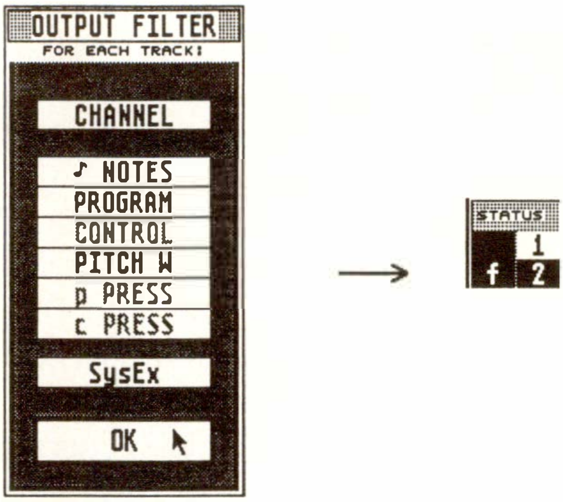
- Create a ghost track of the piano track in an empty track.
- Set the Channel, in the ghost track, of the sampler playing the guitar sound.
- In the ghost track's HIGHEST parameter, set the highest note you want to have played by the guitar.

Ghost example 3: MIDI "echo".

- Record something on pattern 1, track 1, preferably with a hard attack to the sound.
- Make ghost tracks out of tracks 2, 3 and 4 (they all should say "GHOST OF 1 1")
- Now delay the 3 ghost tracks with DELAY values 48, 96 and 144, reduce their velocities with VELOCITY values -20, -40 and -60.
  This will result in a subsiding 1/16ths echo effect, which can easily be varied by, for example, transposing.

<u>MIDI Thru function: if you set the GHOST OF parameter to make a ghost of an empty track, you can use the ghost tracks live as you play</u> *(see Chapter 23, section 6 "Realtime ghost tracks").*

3.10 Output filter



"Playback" track parameters are not restricted to the ones in the track parameter box on the main page.

Each track has its own output filter which allows you to stop various types of MIDI event from being transmitted from the track. To call up the Output Filter window, right-click in the track's STATUS column or select "Output Filter" in the "MIDI" menu.

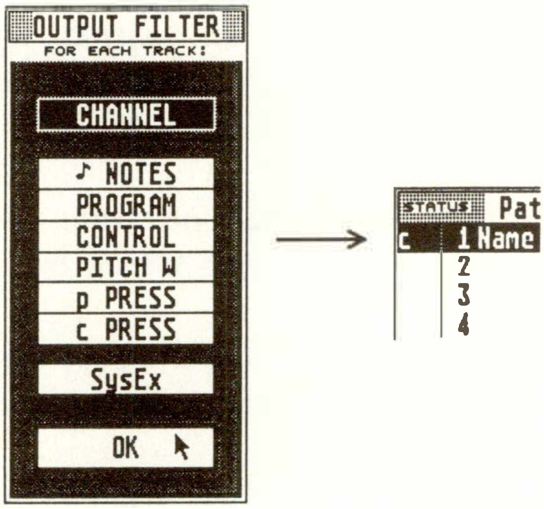
An "f" will appear in the STATUS column if events are being filtered. The filter allows the output of each type of event to be stopped/allowed at will for checking the effect these events have on a synth without having to actually erase anything.

3.11 MIDI Channel filter

Normally, a track's CHANNEL parameter will divert all the events of the track to a certain MIDI Channel, no matter what the Channels of the individual events are.

Switching on the MIDI Channel filter ("CHANNEL" in the output filter window) means the track will only allow through the events that have the same MIDI Channel as that of the track's CHANNEL parameter.

A "c" will appear in the STATUS column if the Channel Filter is enabled.



Example: suppose a track contains events whose Channels are 1, 2 and 3. If you switch the MIDI Channel filter on and set "A 2" in the CHANNEL parameter, you will hear the Channel 2 events only - the others are filtered out. You can transmit on any port.

The MIDI Channel filter is especially useful when used with more than one ghost track, since you can make a ghost track for each Channel contained in the source track, give each ghost track one of the Channels, and switch on the Channel filter in each ghost track. Each ghost track can, of course, have its own set of track parameters, including a different output port.

<u>*MIDI Thru function: this feature is of great use in combination with "realtime ghost tracks" , for when more than one live musician is playing at once using a merged input (eg UNITOR). It allows the synths that are being used to be on different outputs, rather than all having to be connected to the same output.*</u>

Normally, each player can address a different synth but only if the synths are all connected to the same output port, the players are all transmitting on different Channels, and the empty tracks (the MIDI Thru function) are set to "original" Channel.

With the MIDI Output Filter, the synths can be connected to <u>any</u> of the six possible outputs by:

- *making "realtime ghost tracks" of an empty track, one for each synth which is on an output other than the source track's output;*
- *switching on the empty track's Channel filter;*
- *select "original" in the empty track's CHANNEL parameter;*
- *switching on each ghost track's Channel filter;*
- *entering a synth's output port and Channel in each of the ghosts' CHANNEL track parameters.*

4. When track parameters can be "event-altering"

As we have seen, the track parameters are "play-back" parameters: they affect events only when they are playing, and are reversible and "non-destructi-ve".

"Normalize", "Fix Quantize", "Process Data" and "Merging Tracks" are operations that will force <u>each event in the track</u> to alter its values to those of the track parameter.

The results can be seen in the event editor.

These operations do not make a parameter "more reli-able" than before. "Playback" parameters are as reli-able, in timing, as event-altered ones. Also, there is no advantage in being able to see the results in the event editor, apart from the "Transpose" parameter.

Only the last event-altering operation can be rever-sed by pressing (or clicking) UNDO.

Operations involving more than one track are not UNDOable.

4.1 "Normalize" function ("Fast Process Data")

In the main page, the 'N' key will force each event in the current track to alter its values in keeping with those of the current track parameter(s). After using 'N', the track parameters' values are reset to zero; what you hear will, as expected, remain the same, but you will now be able to see the results in the event editor.

A few remarks on "normalizing":

One of the main uses for this is when preparing a track for a MIDI File *(see Chapter 28, section 6).*

Normalizing applies to the track as a whole: it cannot be applied to part of the track - for this use "Process Data" *(see below).*

When you press 'N', all track parameters with a value will be normalized simultaneously (for exceptions, see below), so ensure that that is indeed what you want! Remove values from those you do not want to normalize, press 'N', then restore those values.

Remarks on Normalizing:

CHANNEL: the events will be normalized, but the Channel display will be kept for the sake of clearness. Switching the CHANNEL value to "original" will protect the events in the track from having their individual Channels normalized.

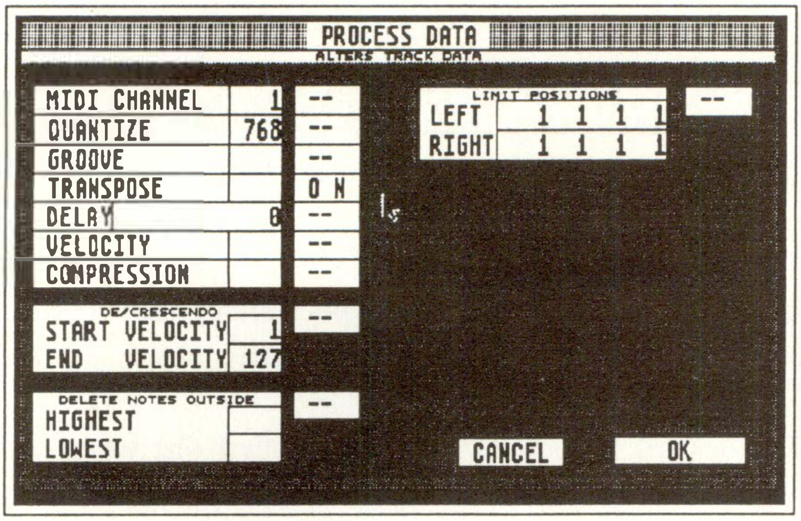
LOOP: loops are not normalizable. The equivalent process would be to use "Segment copy" *(see Chapter 18).*

QUANTIZE, GROOVE: normalization is not carried out, because, unlike any of the other track parameters, the effect of using QUANTIZE or GROOVE is anyway seen in the event editor *(but see "Fix Quantize/Groove" below).*

LOWEST, HIGHEST: notes outside the zone are deleted (of course!).

DELAY: although you can normalize the DELAY/ ADVANCE value, it is better in many situations to keep the flexibility of the "playback" parameter rather than to normalize: before normalizing, temporarily remove the DELAY value, press 'N', then restore the DELAY value.

4.2 "Process Data"



"Process Data" in the "Functions" menu allows you to force each event in the track to alter its values in keeping with those of one or more track parameters, and allows you to limit the process to a part of the track.

The end-effect of "Process Data" is the same as that of "Normalize"; whereas "Normalize" is quick, "Process Data" is more flexible.

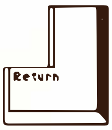
"Process Data" is mainly used with its locators to override the "playback" track parameter on the main page for a certain segment, eg transposing just ten bars of a thirty-bar track, or giving specific bars a different groove value etc.

The "Process Data" window looks rather like the "track parameter box" in the main page, except that you can switch the parameters on and off: only if "ON" will a parameter be processed.

The individual parameters are explained above: you'll see that "Process Data" will delete notes outside the HIGHEST/LOWEST settings.

The "START/END VELOCITY" feature allows you to fade the velocities of notes between the locator positions, starting and ending at the set values, giving a smooth increase or decrease.

Switch "ON" "LIMIT POSITIONS" to limit the effect of "Process Data" to a specific segment; otherwise the whole track will be affected.



The actual "Process Data" is carried out when you click "OK" or press 'Return'. Clicking "OK" carries out the command, but the window stays on the screen for when you have more "Process Data" work to do; pressing 'Return' carries out the command and you are returned to the main page or event editor.

"Process Data" with QUANTIZE or GROOVE: "Process Data" permanently changes events in a track, as we have seen. The exceptions are QUANTIZE and GROOVE which cannot be permanently changed: this is normally never a problem.

So why use "Process Data" with QUANTIZE or GROOVE? Because it allows more than one Quantization or Groove value to be used in a track, since the locators allow the parameters to be zoned. You must ensure, however, that if you have used the zoning capability in "Process Data" to create more than one Quantization/Groove feel in a track, you do not accidentally change the QUANTIZE or GROOVE track parameters on the main page: otherwise, you will lose the different settings and replace them with the new one throughout the track.

4.3 "Fix Quantize/ Groove"

If you are using GROOVE as an "effect" which is markedly different from what was originally played, for example as a way of imposing a swing feel on music that was played in strict time, there are some situations where you may need to "fix".

On the main page, the 'F' key will "fix" the current QUANTIZE or GROOVE value.

Background information: the QUANTIZE and GROOVE parameters always "remember" your original timing, that is, the original positions of your notes. Even when you QUANTIZE or GROOVE a track, the program remembers the original positions and allows you to go back to those positions when you scroll back to "768" or "1536".

Whenever you change from one QUANTIZE or GROOVE setting to another, the program uses a note's original position as the basis of its calculations to work out the new position. This is fine where you want to use GROOVE to perfect a swing feel you have already recorded. But it might cause unexpected results where you played in strict time and want to impose, say, a fairly severe 16 D, E or F swing effect on the music.

In this situation, the GROOVED notes may not quite appear at the time positions you expected for a correct swing. You will know this when it happens after you have selected your Groove value and listened to the result.

If this is the case, select a GROOVE of "16 A", press 'F', then select your final GROOVE value.

What "fix" has done is make the notes' original positions very clear, allowing the correct GROOVE effect to take place.

"Fix" is not intended to be used as a way of "protecting" from accidental alteration the various quantization or Groove settings you may have created using "Process Data" (see "Process Data with QUANTIZE or GROOVE" above).

Once "fixed" at a particular QUANTIZE or GROOVE, notes cannot be made to scroll all the way back to their highest resolution as they used to. Only use "Fix" in the special situation described above. But UNDO will reverse this situation until the next event-altering operation.

4.4 Merging tracks with differing track parameter values

If you merge together *(see Chapter 18)* two or more tracks whose track parameter values differ, this will have a "normalizing" effect on the events in each track.

It has to be so! Each track can only have one "playback" parameter for transpose, for quantize etc. So if you merge together two tracks, one of which is set to TRANSPOSE "+12", and the other to TRANSPOSE "-5", the events in each track will each have their respective TRANSPOSE value forced them because you cannot have two "playback" parameters; the TRANSPOSE value of the merged track will be reset to zero.

The same occurs where one track has a parameter set to a certain value, and the other track's same parameter is not being used.

Where the track parameters have the same values, the events are left unaltered and the track parameter continues to have the same meaning as before the merge.

Example: you already have a track recorded with "QUANTIZE" set to "16" and you wish to double it one octave higher, yet have both sets of notes in the same track: drag the track to an empty track to duplicate it, set "12" in the copy track's "TRANSPOSE" track parameter, drag the copy track on top of the original to merge them again. The notes that all belonged to the duplicate track will now be forced up an octave, the TRANSPOSE value will disappear, but of course the QUANTIZE value remains in force because both tracks shared the same value.

5. Pattern name

Each of the 99 patterns can be named by double-clicking where it says "Pattern" at the head of the window or pressing 'Shift-N'.

The name will be automatically forced onto the arrange pattern of the same number in the arrange list. You can subsequently rewrite a different name by double-clicking the arrange pattern itself.

Type in the name, using 'Esc', 'Backspace' or 'Delete' to delete characters and the cursor arrows to move around, then click "OK".

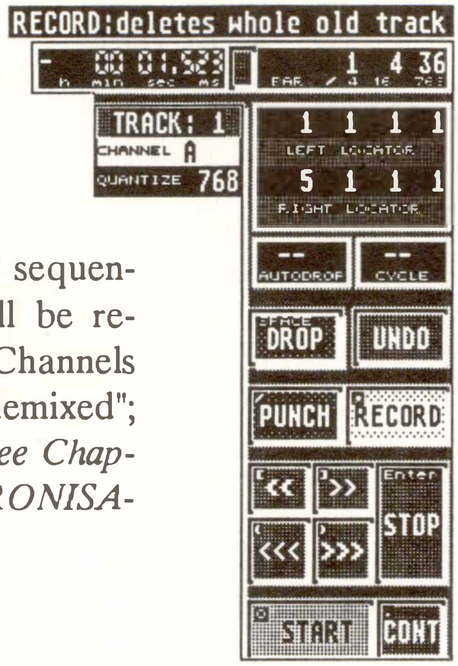
7. Recording

7. Recording

1. Where events can come from

1.1 MIDI data

Anything and everything in the form of MIDI events, received at one of the MIDI Inputs, will be recorded, whether from keyboards, MIDI guitars, drum pads, MIDI bagpipes ...



The list includes other sequencers, whose events will be recorded over several Channels into one track, then "demixed"; also drum machines *(see Chapter 26: "SYNCHRONISATION").*

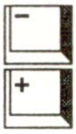
1.2 "Screen recording"

There are events other than MIDI events that can be recorded: two of the many "Pseudo" events are generated by things you do in realtime to the main screen while in record mode. *(See Chapter 8: "PSEUDO EVENTS", section 7).*

These Pseudo events are recorded in the current track in realtime.

Pseudo events can be mixed and moved with MIDI events. For reasons of clarity, it makes sense to give them their own track.

1.2.1 Tempo changes



Any change in tempo during recording will be recorded in the form of "P_USER 1" ("Pseudo-User") events in the current track. These tempo changes can be made by direct clicking of the "TEMPO" display, use of "mouse-as-slider", use of "'Control' + mouse", or the + /- keys on the computer.

The use of "'Control' + mouse" on TEMPO differs slightly from the norm: the changes in tempo are carried out while you move the mouse - you do not have to release 'Control' first. This allows you to record smooth changes of tempo (but if you do ant the tempo to jump to a new setting, hold 'Shift' at the same time, and the new tempo is registered when you release 'Control').

Tempo changes made as a result of using the "Tempo Interpreter" will also be recorded *(see Chapters 25: "TEMPO", 26: "SYNCHRONIZATION")*.

You may also record tempo changes from within the event editor.

1.2.2 Track mute/demute

A track can be muted and demuted at any given point during recording (rather like recording desk muting) by clicking the relevant track number in the arrange list's mute column while in record mode. The mutes/demutes will be recorded at the precise time of clicking, in the form of Pseudo "P_USER 3 and 4" events, which can be edited afterwards in the event list. The events' "second data byte" indicates which track was de/muted.

Use a separate track to record the de/mutes to ensure that you are not "muting the mute track"! If you mute a track, demutes cannot be issued from it.

Mute Grouping: you are not restricted to muting/demuting one track at a a time. You can store up to eight mute/demute combinations and recall them at any time: if you do so while recording, they will be saved in the current track *(see Chapter 20: "ARRANGE MODE", section 6.5 "Arrange mutes").*

1.3 RMG Realtime MIDI Generator

The RMG is a tool which allows you to generate, live, all sorts of MIDI and Pseudo events *(see Chapter 22 on the RMG)*.

2. Metronome, MIDI Click, Count-In

During a recording, the Atari monitor's loudspeaker will give out a metronomic "click". This metronomic click over the loudspeaker is normally present only when in RECORD and PUNCH modes. You may prefer not to use this, but to use the "MIDI Click" feature instead, so just turn down the monitor's loudspeaker.

If "MIDI Click" is enabled in the "MIDI" menu, a short metronomic note will be sent: its MIDI Out port, Channel, pitch and velocity are settable in the "MIDI Thru" window in the "MIDI" menu (or click the "MIDI THRU" box at the bottom of the main page). The settings can be altered while you are in record mode - you will hear the changes as they are made *(see Chapter 21: "SYSTEM SETTINGS", section 2 "MIDI Click").*

These settings in the "MIDI Thru" window are storable as part of a CREATOR or NOTATOR "AUTO-LOAD SONG" - see Chapter 28: "DISK OPERATIONS", section 2.3.

The "Flags" menu has the "Play Click" option which switches on the metronomic click in playback mode.

The count-in, which comes defaulted to one bar, can be altered under "count-in" in the "Options" menu. The display shows bars in absolute lengths: eg 1 0 0 0 means exactly one bar's count-in.

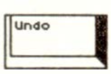
CREATOR and NOTATOR allow you to record during the count-in. In the arrange mode, the sequencer starts with the last bars of the previous pattern, depending on your count-in length.

It is important in most cases to record, listening to the metronomic click. Only by keeping as close as possible to the click can you be sure that:

- **QUANTIZE and GROOVE will function correctly;**
- **the notation in the score editor will look correct.**

3. Ways of recording

3.1 Simple recording



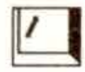
Record-delete: pressing the '*' key at the top right of the calculator keypad (or left-click RECORD) will erase any existing data in the current track and will record-delete new data. Straight after recording, the 'Undo' key will toggle between any old data and the new.

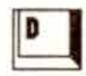
3.2 Merging into an already-recorded track

Record-merge: pressing the 'R' key (or right-click RECORD) will keep any existing data in the current track and will record-merge new data. You get a count-in as with record-delete. Record-merge allows you to add notes and other events into the existing track, although it is better to record these on a separate track and merge afterwards, for clarity.

Drop-merge: pressing the 'Spacebar' key (or click DROP) is also a record-merge function, except that there is no count-in and no start command, and so can be used to drop in on a track that is already running and drop out again to add some data.

3.3 Replacing part of an already-recorded track with "Punch-Drop" and "Punch-Autodrop"





Punch-Drop: pressing the '/' key (or click PUNCH) and then using the DROP command will erase the section of track between the "punch-drop" in and "punch-drop" out points, whether or not something new is recorded.

Note how the "Drop" command changes meaning when used with the "Punch" command.

Punch-Autodrop: pressing the '/' key (or click PUNCH), clicking "AUTODROP" to "ON" (or press 'D'), setting the locators, and then using START or CONT (don't use RECORD!) will erase the section of track between the left and right locators whether or not something new is recorded.

The sequencer will drop in at the left locator and drop out at the right locator positions, allowing great precision.

PUNCH acts as a security key for DROP and AUTODROP to prevent inadvertent deleting; however, using PUNCH on an empty track will immediately enter record mode, as there is nothing to protect.

4. Recording in the CYCLE mode

You may record data while cycling between two locator points. All such data is can be quantized automatically during recording (at the end of each cycle), or afterwards, and all quantizing is reversible as usual. There are five methods of record-cycle, selectable in the "Flags" menu:

4.1 Record-cycle overdub ("Flags" menu is ticked): MERGES!

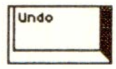
CREATOR and NOTATOR default to this option. "Record-cycle overdub" is where fresh data from each successive layer of the cycle mode in record mode is merged into the previous layer(s) without damaging the previous layer(s). This method is similar to a drum machine's record mode.

Switch "CYCLE" "ON" (press 'C' or click "CYCLE") and set the left and right locator positions. Now start recording as usual: the sequencer will play as far as the right locator and immediately start again at the left locator etc until you press STOP.

Starting the recording with "Record-delete" (left-click on RECORD) will delete any data that was previously in the track; there will be a count-in at the start. Starting the recording with "Record-merge" (right-click on RECORD) will keep any data that was previously in the track; there will be a count-in at the start.

The sequencer can distinguish between each successive layer of "record-cycle overdub" (up to 16 layers) and numbers each layer in the tracks STATUS column as you record. All the layers are in the current recording track.

The numbering of the layers allows you to see which cycle you are recording in, so that if you want to delete a layer, you will know which one to go for:



- **Selectively deleting layers with "UNDO":** while in record mode, you can click "UNDO" (or press the 'UNDO' key) which will progressively delete each layer, starting with the most recent one.
- **Selectively deleting layers according to layer number:** while in record mode, you can right-click a track number, whose number corresponds to the layer you wish to delete.

The sequencer distinguishes between the layers by internally assigning to each cycle layer's events their *own internal MIDI Channel*, corresponding to the layer number. As usual, though, the track's "CHANNEL" parameter on the main page determines which instrument you are actually addressing live - being a "playback"-type of parameter, it overrides what's going on internally. The master keyboard's transmit Channel is completely replaced by the above process.

Having different Channels in the track's event list means you can visually pick out each layer's events, but also allows you to use functions such as "Extract One Channel" or "Demix All Channels" (in the "Functions" menu) to split off each layer to its own track.

This distinguishing between layers is not available if the track where you are recording is set to CHANNEL "original".

Be careful that the layering of events other than notes, such as pitch-bend data, can lead to weird results. Also, do not record-cycle System Exclusive data.

You may need to use the "Check" function in the "Functions" menu to delete duplicated notes after recording in the cycle mode. Duplicated notes are easily avoided if you are clear as to where your cycle starts and stops.

Changing tracks in record mode: another neat way of achieving instant creative results in or out of "Record-cycle" mode (though it is at its best using the "Record-cycle" method of recording) is the ability to **change tracks** within a pattern and **alter track parameters,** all without ever leaving the record mode.

To change tracks in record mode, left-click in the new track or press the up/down cursor arrows.

4.2 Punch-cycle overdub (menu is ticked): MERGES!

"Punch-cycle overdub" is intended for manually replacing part of a track "on-the-fly" with the advantage of being able to add layers as you cycle; the rest of the track remains unharmed.

Its long title is "Manual Punch-drop in cycle mode with merging of successive layers"!

- set up a cycle around the track segment you wish to replace (with a couple of extra bars either side for clarity - though not if you are using AUTO-DROP, see below);
- tick the above menu option and press "PUNCH";
- start playback mode with START or CONT;

- at the place you wish to start replacing, click "DROP" (or press 'Spacebar'): what was there is now deleted. Play the new notes until you use "DROP" again, at which point the deleting of the original track ceases;
- the cycling continues, you are still in "PUNCH" mode: this means that if you "DROP" into the same part of the track again, this time you will not delete the last notes, but will start merging. You can "DROP" in and out as often as you like over the same segment of track and keep adding; careful not to "DROP" in on a different part of the track or you will delete it.

This merging side to "Punch-cycle overdub" is exactly the same as "Record-cycle overdub" (see above) except that the initial use of the "DROP" command deletes what is in the track between the points you drop in and out - after that, you are merging the successive layers.

On loading CREATOR or NOTATOR, "Punch-cycle overdub" (merge) is switched off.

4.3 Record-cycle replace ("Record-cycle overdub" menu is unticked): REPLACES!

If "Record-cycle overdub" is unticked in the "Flags" menu, you are in "Record-cycle replace" mode.

"Replacing" is where fresh data recorded during a cycle replaces (deletes) the previous layer: as soon as you play a note during a cycle, you have deleted whatever was in the layer from that point on until the right locator position: you are therefore committed to carrying on playing until the end of that cycle.

If there was data before the point you started playing, it will be kept unharmed. If no data is recorded during a cycle, the last-recorded layer will be kept unharmed:

- select the cycle locators and switch CYCLE on;
- click RECORD;
- start playing after the count-in;
- from now on, if you play in the next cycle, you are automatically replacing the previous one; if you do not play, the previous cycle is kept.

Record Cycle Replace comes in useful when perfecting a certain musical part, like a solo or a bass line. Without ever having to touch a new command, you can record, listen, decide and then alter your music (just by starting to play!) without halting the creative flow. You can listen to a cycle for as many times as you like while you decide what changes (if any) you want to make. However, as soon as you start to record again, all the events in the track which lie <u>after</u> this note are erased and replaced by the new events; all the events which, in the track, lie <u>before</u> the new note remain unaffected.

As soon as the definitive version is recorded in the track, it is a good idea to STOP the process and carry on recording on a fresh track.

Instead of the usual "Record-delete", you could try starting "Record-cycle replace" with "Record-merge" (right-click RECORD): use this if you already have something in the track, as it will keep that data unharmed - only the new cycles will be affected by "Record-cycle replace".

On loading CREATOR or NOTATOR, "Record-cycle replace" is switched off.

4.4 Punch-cycle replace ("Punch-cycle overdub" menu is unticked): REPLACES!

If "Punch-cycle overdub" is unticked in the "Flags" menu, you are in "Punch-cycle replace" mode.

The PUNCH side of this works just like that of "Punch-cycle overdub" (see above); the "replace" side works just like "Record-cycle replace" (see above). **"Punch-cycle replace" is intended for manually replacing part of a track "on-the-fly" with the advantage of being able to keep deleting the track between the points where you "DROP" in and out, for instance, to perfect a solo; the rest of the track remains unharmed.**

Here, "replacing" is where fresh data recorded after you have used "DROP" deletes the track from that point on until you DROP out of record again: when the sequencer cycles round again, as soon as you play a note during record mode, you have deleted whatever was in the track from that point on until where you DROP out of record. If you do not play anything during the next cycle, the last data is kept.

Its long title is "Manual Punch-drop in cycle mode with selective deleting of successive layers"!

- set up a cycle around the track segment you wish to replace (with a couple of extra bars either side for clarity - though not if using AUTODROP, see below);
- ensure "Punch-cycle overdub" is unticked and press "PUNCH";
- start playback mode with START or CONT;
- at the place you wish to start replacing, click "DROP" (or press 'Spacebar'): what was there is now deleted. Play the new notes until you use "DROP" again, at which point the deleting of the original track ceases;

- the cycling continues, you are still in "PUNCH" mode: this means that if you "DROP" into the same part of the track again, you will delete the previous notes, but only from the point you start playing. You can "DROP" in and out as often as you like over the same segment of track and keep replacing; careful not to "DROP" in on a different part of the track or you will delete it.

On loading CREATOR or NOTATOR, "Punch-cycle replace" is switched on.

4.5 Cycle-Autodrop

The combination of "AUTODROP" and "CYCLE" is particularly useful for busy musicians: the program automatically shuttles between the two locator positions, but includes the count-in (normally one bar) which you have preset in the "Options" menu.

On pressing start, the sequencer will jump to the start of the count-in, wherever the left locator is positioned. This is a great help in situations where you are working deep in a pattern, since normally you would need to first scroll the Main Bar Counter to a couple of bars before the left locator position and then use the "CONTinue" command.

The effect of the "AUTODROP" function in "CYCLE" mode is exactly the same as if you were using the two "PUNCH-CYCLE" methods described above, but allows great precision since the locators are accurate to the nearest 1/768th or 1/1536th note.

The one difference is that the locators represent the positions where the sequencer drops in and out AND the cycling locators: the reason why it gives you an automatic count-in is so you have a "breathing space" between the cycles.

For exact descriptions of what you can expect from "Cycle-Autodrop", read the two "Punch-cycle" sections above. Where they mention "pressing" or "clicking" DROP, bear in mind this is now automatically done by "AUTODROP" if you have switched it "ON". Also, you must set the locators to the exact drop in and out positions. Here is a "Cycle-Autodrop" check list:

- Switch "AUTODROP" on
- Switch "CYCLE" on
- Switch "PUNCH" on
- Set the exact locator positions of the segment to be replaced
- press START, and the sequencer will jump to the count-in bar before the left locator, automatically "Punch-drop" into the track at the left locator, drop out of the track at the right locator and jump back to the beginning of the count-in etc.

5. Transport remote for recording

When "Key Remote" in the "MIDI" menu is ticked, NOTATOR's and CREATOR's most important transport functions can be controlled from a MIDI keyboard *(see Chapter 5: "POSITIONING", section 4.2)*.

6. "No push near 1"

This option in the "Flags" menu should always be left switched on.

It ensures that any recorded note that falls very close to the downbeat "1 1 1 1" (within 1/48th) is actually moved onto position "1 1 1 1". This takes care of the situation that could arise at any time, where you wait for the count-in to pass then start recording your notes: if you then choose to play-back without quantizing (and why not!), there is a chance that the first note or chord you played, which you intended to be on the downbeat, may be a tiny bit early, and so would not be heard since a sequencer's START command is always on the downbeat. "No push near 1" rounds off the time position of the first note.

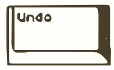
CREATOR and NOTATOR will record anything you play during the count-in anyway: it is just the tiny area around the downbeat that is enhanced.

7. "Auto-quantize after recording"

A Quantize, Groove or Adaptive Groove value given to an empty track (MIDI Thru function) before you start recording will automatically quantize the track as soon as you press STOP or START after recording.

This "auto-quantize" is no different from quantizing etc a track manually after recording: it just saves time every time you record.

8. Undo



Clicking "UNDO" (or pressing the 'Undo' key) will reverse the effect of the last deleting, event-altering, or rerecording operation made in one track.

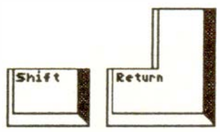
This is a useful "face-saver" if you have inadvertantly done something you wish you had not, such as erasing a track, recording over a track, transforming one event type into another event type, also "Delete/Write Sync Reference" and "New Arrange". You can even toggle between the old and new versions.

UNDO is not available where more than one track is involved, eg Mixdown, Merge, Demix Channels, Multicopy etc.

9. "Buffer recording"

You will have noticed how the "FREE" display at the top left of the screen "counts events" as you play, even when you are just doodling around in playback mode, trying out some ideas against the music.

Suddenly, you play something which is brilliant...but you cannot remember what you played! It's lost forever - or is it! CREATOR and NOTATOR have a large buffer that absorbs everything you play, whether recorded or not. Usually, the buffer is used to cope with functions like "Undo", but the user can also make use of it.



In the above situation, if you press 'Shift-Return' together BEFORE pressing STOP, the current track will receive the contents of the buffer, including that brilliant riff! What a life-saver!

There are certain simple conditions to follow if you know you will be using this feature:

- ensure the buffer is empty to start with by pressing STOP twice;
- ensure that when you press 'Shift-Return', the current track (the one with the cursor on it) is empty;
- ensure you press 'Shift-Return' BEFORE pressing STOP at the end;
- don't be tempted to go on for too long, or the buffer may empty itself automatically.

8. Types of Event

8. Types of Event

TYPES OF EVENT

A MIDI event is a little packet of information. It consists of three smaller packets of data called "bytes". You do not need to know all about bytes, but it does help to be aware of them since it makes it easier to understand the display of CREATOR and NOTATOR, both in the event list and in the Transform window.

In the event list and the Transform window, CREATOR and NOTATOR display MIDI events in easy-to-understand sections: the event's...

- Time position
- Status (what the event is)
- MIDI Channel
- "First data byte" *(what it is depends on the status)*
- "Second data byte" *(what it is also depends on the status: some events don't make use of the second data byte)*
- Note length *(for notes only)*

In a MIDI event, the Channel value belongs to the "status byte".

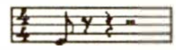
The "first" and "second data bytes" change their meanings according to the event's status. In the event list and the Transform window, their columns are each headed "-1-" or "ONE", and "-2-" or "TWO".

CREATOR and NOTATOR also use "Pseudo" events (which are displayed as "P_USER" events in the event list). These are "house-keeping" events that organize things within the sequencer and are not transmitted via MIDI.

1. Note On, Note Off

MIDI Spec 1.0 defines a note as consisting of two separate events: a Note On event and Note Off event.

```
1  1  1  1 NOTE   1  E3   64        2  8   →
1  1  3  1 NOTE   1  E3  off
```



The "first data byte" of a Note On event defines the note's pitch (eg C3); the "second data byte" defines the note's velocity (how hard it was struck).

The note will continue playing until it receives a command to turn it off. There are two ways of switching a note off:

- A second Note On event of the same pitch, but with a "second data byte" value of zero (ie zero velocity);
- An official Note Off event: in this case, the "second data byte" can define the key's "release velocity", ie how fast you let go the key after playing it.

So there are two ways of issuing a "switch that note off" command. They both have exactly the same effect on a note; in theory, the official Note Off event has the advantage of giving the musician greater expressive control over a sound, but in reality there are very few MIDI devices that respond to a release velocity. Also, they both tend to be called "Note Off" events or commands.

(In fact, the "Note On with zero velocity" event is technically preferable because it takes advantage of the "Running Status" facility of MIDI, which allows the transmission rate of events to be a little higher.)

In CREATOR and NOTATOR, there is never any need to bother about Note Off events as these are automatically dealt with by the program; where you see the words Note On on the screen, you may safely assume that the Note Off is being taken care of *(see also Chapter 30: "APPENDIX", section 1.7 "One note: two events").*

2. Pitch Bend Change

A Pitch Bend Change (also called Pitch Wheel) event (displayed as "Pitch Wh" in the event list) defines the amount of pitch change away from the keyed note. These events define the amount of change **up to the limit set in the synthesizer.** So if the synth is set to a pitch change limit of a tone, the maximum Pitch Wheel event value will send the pitch up/down a tone, and no more. So different synths will react differently to the same Pitch Wheel events, depending on what you have set as being their limit.

```
1  1  1  1 PitchWh 1    0  64   ⟶
```

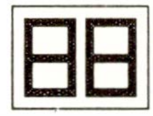
The "second data byte" is the deciding value: 64 is the normal resting value, 0 means "maximum bend down" and 127 means "maximum bend up".

In theory, the "first data byte" allows very fine steps between the steps of the "second data byte". In practice, though, it is normally left at zero, and even if sent, most synthesizers completely ignore it.

3. Program Change

A "Program Change" event ("Program" in the event list) selects a numbered "memory slot" in a MIDI device, containing a sound, reverb effect etc.

```
1  1  1  1 Program 1    88
```

→ 

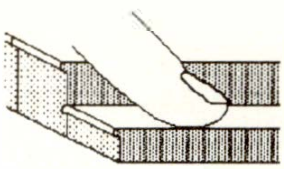
A program event makes no use of the "second data byte", so it is left blank. The "first data byte" defines the Program number.

This Program number is correct for all devices which follow the standard MIDI configuration of having zero as the first Program, and which count in decimal. Some devices' Program banks start with "1" (eg Yamaha DX7), which means, for example, Program 27 will be interpreted by such a device as Program 28. With synthesizers which do not count in decimal, it is a good idea to make up your own chart showing the conversion of the device's Program number system to decimal.

All MIDI devices require a certain time to switch Programs. Although you are able to transmit a note and a Program event on the same Channel at the same time, while a Program is switching, the device cannot play anything, and will either ignore notes being sent to it, or will delay playing them until the new sound is in place: you may perceive a slight hesitation or "glitch".

This hesitation is not due to problems of "timing", but to the relatively slow reaction time of synthesizer hardware. Program events should therefore be transmitted where there are no notes being sent on that particular Channel. Allow around 1/16th or 1/8th space before the next note is due to play, and be careful not to chop off the end of a note that is already playing, for example, one with a long "release time". Be aware that multitimbral synths (ones that can respond to more than one Channel at a time) normally need more time to react to commands such as Program events than monotimbral ones.

4. "Aftertouch": Channel Pressure and Polyphonic Pressure



```
1 1 1 1 C-Press 1    8
1 1 1 1 P-Press 1  E3    8
```

"Aftertouch" or "pressure" events are transmitted by some synthesizers if you press on one or more keys after the initial keystrike. The values created by this subsequent pressure can be used by a synth to control sounds.

There are two types of Aftertouch events:

- "**Channel pressure**" (called "C-Press" in the event list) is currently the most common status of the two. It is "monophonic" (like the modulation wheel), in that it affects all the voices collectively, no matter which key is pressed. The "second data byte" is not used and not sent: the "first data byte" defines the amount of pressure.

- With "**Polyphonic pressure**" ("P-Press" in the event list) each key can send an individual amount of pressure. The pitch of the key ("first data byte") is transmitted as well as the pressure amount ("second data byte"). At present there are few keyboards which can send or receive this information.

Aftertouch information is often confused with velocity. They are, however, two completely different types of MIDI information. Velocity belongs to a Note On event and gives details as to how fast ("hard") the note has been initially struck. It is not an independent event on its own.

The two types of Aftertouch event are events in their own right and behave similarly to events given out by the modulation wheel, in that each little extra movement of your fingers transmits a new MIDI event. With a heavy playing style, this information is continuously being transmitted, and you consequently can use up a large amount of memory space and allow these events to "get in the way" of notes. If you are not using Aftertouch, it is advisable to stop these events from coming into CREATOR or NOTATOR by filtering them out: switch off "c PRESS" and "p PRESS" in "Input Handling" (in the "MIDI" menu).

If you decide to record these events, though, the two automatic functions which optimize MIDI timing, "Play Algorithm" and "Data Reduction", ensure that notes get priority treatment when the sequence is played back *(see Chapter 30: "APPENDIX", section about "Main CREATOR/NOTATOR Concepts".*

5. Control Change

```
→    1  1  1  1 Control 1    1   0 Mod. Wheel
```

Control events can affect important functions of a MIDI device. Which Control events are transmitted/received by a device depends on the device, so check your devices' "MIDI Implementation Charts".

List of common Control events:

DEFINITIONS-	STATUS	-1-	-2-
Modulation Wh:	Control	1	(Amount)
Breath Control:	Control	2	(Amount)
Foot Pedal:	Control	4	(Amount)
Data Entry:	Control	6	(Amount)
Volume:	Control	7	(Amount)
Balance:	Control	8	(Amount)
Panning:	Control	10	(Amount)
Expression:	Control	11	(Amount)
Sustain On:	Control	64	127
Sustain Off:	Control	64	0
Portamento On:	Control	65	127
Portamento Off:	Control	65	0

There is not the space to deal with each Control event in detail but you can save yourself hours of reading by trying things out for yourself. CREATOR/NOTATOR will allow you to record as usual while you are in the event editor. Whatever you input via MIDI will now be displayed in the event list as it happens.

6. System Exclusive

This section discusses "SysEx" data and what CREATOR/NOTATOR allow you to do with it (virtually anything!). The editing of SysEx data is best left to SysEx freaks unless you know what you are doing. However, no harm can come of your experimentation apart from losing sounds etc in your synths.

System Exclusive messages contain information specific to each manufacturer and to each instrument, and relate to specific areas such as the transmission of memory and sound data. These "SysEx" messages are transmitted in MIDI event form; the information itself, though, does not necessarily conform to MIDI protocol, which means that one manufacturer's SysEx data cannot be received by another.

```
1  1  1  1 SysExcl     4   0 Moog
1  1  1  1 SysExcl    19   0 Digidesign
1  1  1  1 SysExcl    41   0 PPG
```

CREATOR will record and play any SysEx data, and you can view and edit it (if you know what you are doing) in the event list as usual, though until you have gained experience with MIDI events, we recommend that you ignore SysEx messages for the time being (apart from noting where they occur in the sequence). On the other hand, it can be very necessary for certain applications to be able to alter existing messages.

There are virtually no restrictions in the way SysEx messages can be administered: any manufacturer, any instrument, any future MIDI device (if it conforms to the present day MIDI Spec) can be processed by CREATOR/NOTATOR, and the data can be edited in the event list by those who know what they are doing.

A SysEx event can be of virtually any length; whatever the length, it remains one event and may not be interrupted by any event other than MIDI clocks and other System Realtime messages. The transmission time can be very long.

The number of "data bytes" after a "SysEx" status can be huge; the time position of a SysEx event is the time position of the SysEx header. Each additional line of "data bytes" does not get a time position in the event list, as each byte follows on as quickly as possible.

No other MIDI events (other than System Realtime ones) can be inserted while a SysEx event is in progress. This is not a problem where the SysEx event is as short as the usual MIDI events. However, as each "data byte" requires around 320 microseconds of valuable MIDI transmission time (one three thousandth of a second), you can see how a long message can lead to timing problems if notes are queuing up to be sent. This transmission time is not set by CREATOR/NOTATOR, but by the agreed MIDI protocol. Because SysEx is not Channel-specific (see below), sending a SysEx message to a multitimbral synth will affect the whole synth.

Note that overall timing is maintained - it is the notes that are directly affected by the sending of a SysEx message that get delayed.

So, if you need to transmit sound banks, you should either do so separately from the song, or send them before the count-in. Single patches should not prove to be a problem and can be sent during a piece of music in any convenient space.

An "EOX" message ("End Of SysEx") signals the end of a SysEx message: as it must always be present, it does not appear in the event editor. Any Status byte will abort the SysEx message.

6.1 System Exclusive Device Number

MIDI System Exclusive events are not the same as MIDI events that have a Channel byte, in that they do not contain information relating to a MIDI Channel. A SysEx message on one of the MIDI Output ports will be sent to all the instruments which are connected to that port, regardless of their Channels, but only the instrument whose "device number" matches that of the message will receive it.

Almost all manufacturers do send a "device number": this private ("exclusive") number defines the instrument the manufacturer wishes to address, but because there is no way of knowing exactly what the manufacturer means by the device number (it is not a formally-agreed number), CREATOR/NOTATOR will send SysEx as it was received: the CHANNEL track parameter has no effect on SysEx messages. CREATOR can however recognize certain manufacturers, in which case the event list will display the name.

A SysEx header (the first line of a SysEx message in the event list) contains a manufacturer number: this is recognizable and you will see the manufacturer's name in the event list.

6.2 Realtime sound editing via SysEx

Many synthesizers and other MIDI devices allow you to alter their parameters via SysEx.

Filter cutoff point, pitch, envelopes etc are all editable in these devices. If the synth sends these, they can be recorded and played back. These events are very short and can be sent during a sequence with no problem.

The user-definable fader section of the RMG with its "Listen to MIDI" function is the ideal way of altering the values of compatible synthesizers in realtime (see Chapter 22: "REALTIME MIDI GENERATOR").

6.3 Active sound dumps

This area of SysEx is the one that almost anyone can, and does, use, since it is simple and useful, allowing you to store the memory contents of the device in CREATOR/NOTATOR.

An active "sound dump" is where all or part of the contents of a MIDI device's memory are sent in the form of SysEx data via MIDI after pressing a button on the device.

If what you want to do is store sounds and edit them, on the whole it is better to use specialized programs such as C-LAB's POLYFRAME.

But CREATOR/NOTATOR can also be used as stores of sound dumps. To do so:

- Put CREATOR or NOTATOR into record mode. Wait for the count-in to pass
- Send the data from the MIDI device (eg by pressing a button that transmits the data - look in the device's operation manual)
- Name the track in CREATOR and save the track to disk (via "Save Sequence" in the "File" menu.

To send sounds back to the synth:

- Load the track from disk (via "Load Sequence" in the "File" menu
- Ensure the receiving device can receive the data (memory protection switched off, "SysEx Info Available" etc)
- Put CREATOR/NOTATOR into playback mode (maybe with reduced tempo).

Using CREATOR or NOTATOR for SysEx work requires a certain familiarity with MIDI since they will record and reproduce everything, which can lead to some surprising effects. You should, for example, disable the MIDI Thru function ("MIDI Thru" in the "MIDI" menu) when recording or risk confusing your synth if it receives SysEx events while it is transmitting them! Likewise, turn off the MIDI Click (in the "Options" menu).

6.4 Dump requests

In some situations, you may not want to use the "active dump" method (and some synthesizers are unable to do active dumps: instead, they need to be "milked" of their data by MIDI dump requests from the sequencer or editor/librarian).

If this is the case, if a synthesizer receives a "dump request" from CREATOR or NOTATOR, it will immediately respond by transmitting all or part of its memory contents.

You can create your own dump request in the event list. If you create one in a track, then record in another track, the synth's answer (its memory contents) will be recorded in that track.

The question is, how to create a dump request. There are three possibilities:

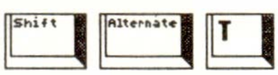
1. You create your own dump request in the event list. The information is usually to be found in your device's manual in the MIDI implementation section.
2. Your editor/librarian has a ready-made dump request which you can use.
3. CREATOR and NOTATOR come with a file called "REQUEST.SON" which is a collection of some dump requests. The one you need may be on there.

6.5 Handshaking

There are synthesizers that require repeated dump requests to complete a dump: this is known as "handshaking". Handshaking is specific to each manufacturer and goes something like this:

- Please transmit data
- Here is the first set of data - do you want more?
- Yes, carry on
- Here is the next set of data - do you want more?
- Yes, carry on (etc)

Individual handshaking messages are SysEx events and can be sent by CREATOR/NOTATOR. The programming of handshaking routines can be much more complicated than simple request dumps due to their variety and the need for a correct elapsed-time reference.



The programming of these countless SysEx hand-shaking messages can be made easier with "Segment Copy" and "Transform". "Fast Transform" can be very useful: in the event list, the 'T' key copies the cursored value onto the same position of the next SysEx event that shares the same ID; 'Shift-T' does the same with all the following events; 'Shift-Alternate-T' adds an increment of +1 to each subsequent event.

In the programming of a handshaking message, CREATOR can be instructed, through P_USER 127, to wait for a given number of MIDI bytes from the synthesizer, the exact number set by the "second data byte". Only after receipt of these bytes will CREATOR continue with the next handshaking event. There are other P_USER events that are also intended for use with SysEx handshaking, but all these routines are not easy to operate unless you are a MIDI protocol expert.

However, most synthesizers are able to transit information without a dump request: this is called an "active dump" (see above). Handshaking is rarely needed, and those manufacturers whose instruments need this protocol recommend the use of dedicated editor/librarian programs for the storage of sound data, rather than sequencing programs such as CREATOR or NOTATOR.

6.6 Sample data

The sound data of sampling devices can also normally be sent via MIDI to CREATOR/NOTATOR in the form of SysEx data (called "sample dumps").

Sampled data is however many times longer than synthesizer sound data and transmission times of several minutes are common.

Factors restricting the sending of sample dumps include the memory (RAM) capacity of the computer itself which can be overstretched by hundreds kilobytes or even Megabytes, plus there is the chance of some of the millions of bits of MIDI going wrong, which can be noticeable on playback. Since sampling devices normally have their own disk drives, it does not make sense to struggle with these outer limits of what is feasible in MIDI. We would therefore encourage you to use CREATOR for what it was designed, and not as a databank for samples!

6.7 Checksums

Some devices work with Checksums. This is a calculation based on the data sent and is usually sent last. The receiving device also works out the Checksum then compares it with the sending device's one. If the Checksum is the same, the transmission was free of error.

If you change values in the event list, you will need to alter the Checksum as well otherwise the data will be rejected. This manual is not in a position to take you through that process!

7. Pseudo ("P_USER") events

```
1  1  1  1 P_USER      1 120  abs. Tempo
1  1  1  1 P_USER      3 120  Mute Track
1  1  1  1 P_USER     20 120  Load Song
```

CREATOR/NOTATOR use several additional types of event which control certain internal processes. These fake or "Pseudo" events do not form part of standard MIDI Spec and are not transmitted via MIDI.

The exceptions are those Pseudo events that are used for specific MIDI routines, such as Pseudo events 5 to 12 to which can be assigned user-defined MIDI data in the RMG.

Pseudo events (called "P_USER" in the event list) have a P_USER number and a value (though no MIDI Channel, of course). Here is a selection of the most commonly-used:

P_USER 1: "Absolute Tempo"

P_USER 1 can be used to control the sequencer's tempo by altering the "second data byte". Whenever a track containing one of these events is played back, the new tempo will change at the event's time position. Using the "Fittime Calculator", you may insert a tempo of up to four decimal places. This event is generated in the current track in record mode whenever certain functions are used on the main page *(see Chapter 25: "TEMPO").*

P_USER 3: Mute Track

A track can be muted at any time position by using this event in a different track in the same pattern; the "second data byte" gives the track number to be muted.

P_USER 4: Demute Track

A track can be demuted at any time position by using this event in a different track in the same pattern; the "second data byte" gives the track number to be demuted.

Take care not to have a track muting itself, or the demute command will never be transmitted! Always use a separate track to contain mutes and demutes.

P_USER 20: Load Song/Exchange Song

When its "second data byte" is at "0", this event will load a song off disk into the computer's RAM, even while another song is still playing. A second P_USER 20 event whose "second data byte" is at 1 will exchange the current song for the recently-loaded one *(see Chapter 28: "DISK OPERATIONS")*.

P_USER 21, 22, 23, 25: HUMAN TOUCH

These events allow various clicks to be created and sent to the outputs of HUMAN TOUCH *(see Chapter 27: "UNITOR, ...")*.

P_USER 50: MIDI Song Select

```
1  1  1  1 P_USER      50   0 Song Select
```

P_USER 50 enables the selecting of a song in another device (eg in a drum machine) by inserting the song number as this event's "second data byte".

P_USER 51 - 99: NOTATOR events

```
1  1  1  1 P_USER      55   0 Signature
1  1  1  1 P_USER      56   0 Repeat
1  1  1  1 P_USER      58   0 Guitar Chord
1  1  1  1 P_USER      63   0       Segno
1  1  1  1 P_USER      66   0       Trill
1  1  1  1 P_USER      82   0 upper Key
1  1  1  1 P_USER      83   0 lower Key
```

These events mainly deal with NOTATOR's score display *(see Chapters 10 to 14)*.

P_USER 60: Text

Allows you to insert text within the event list *(see Chapter 9: "EVENT EDITOR", section 10)*.

P_USER 100: MIDI Message

```
1  1  1  1 P_USER     100   0 Midi-Message
```

P_USER 100 transmits its "second data byte" (0-255) over MIDI. This enables specific messages to be sent at specific points in time. For example:

TUNE REQ:	246	START:	250
EOX:	247	CONTINUE:	251
MIDI CLOCK:	248	STOP:	252

P_USER 101: Switch MIDI Clock

```
1  1  1  1 P_USER     101   0Switch MClock
```

P_USER 101 turns CREATOR/NOTATOR's output MIDI Clock off and on ("second data byte" 0 and 1) at specific points in the sequence. This allows you to pre-program pauses in, say, a synchronized drum machine.

P_USER 120: Ignore Bytes

```
1  1  1  1 P_USER     120   0 ignore Bytes
```

P_USER 120 instructs CREATOR/NOTATOR to ignore bytes coming in at the MIDI Input, the exact number determined in the "second data byte". So, during a handshaking protocol, specific SysEx headers can be filtered out from the recording as the MIDI device sends its data.

P_USER 122: Copy Next Event Into Input Buffer

```
1  1  1  1 P_USER     122   0CopyEvntToRec
```

P_USER 122 copies the whole of the following event into the buffer as if it had just been recorded. So, in the context of a handshaking routine, a received SysEx message can be altered and replaced at will (using eg P_USER 120 - see above) during the recording.

P_USER 126/127: Wait For MIDI Bytes

```
1  1  1  1 P_USER     126   0E&WaitBytes&E
1  1  1  1 P_USER     127   0 Wait Bytes
```

In the programming of a handshaking routine, P_USER 127 makes CREATOR/NOTATOR wait for a given number of MIDI bytes, the exact number set by the "second data byte". Only after receipt of these bytes will CREATOR continue with the next event.

P_USER 126 is a special case: if this event is inserted between two SysEx messages, then the EOX (which is normally sent at the end of the first SysEx message), and the SysEx status of the second SysEx message, will be suppressed. The result is one long message, interrupted by the handshaking event.

9. Event Editor

9. Event Editor

EVENT EDITOR 9

1. Overview

There are just two "pages" in CREATOR/NOTATOR: the <u>main page</u> which you see when you have loaded the program, and the <u>event editor</u> described here. The event editor page lets you view the event contents of each track: place the track cursor on the track you wish to edit and press 'E' or click the large "EDIT" icon in the main page.

The event editor is an "environment" that contains four editing tools, each of which is an editor in its own right: each editor displays events in a different way, and each is fully editable and interactive with the others. These are:

1. Event List with its own graphic display
2. Matrix Editor
3. Hyper Edit
4. Score Editor (NOTATOR only)

Each tool has various controls that are exclusive to it, plus the event editor has a set of global controls that control the overall page.

"Event List": displays every MIDI and P_USER event in a track. It shows the exact numerical values of events with their exact time positions, and the order in which the events are listed dictates the order in which they are sent from the MIDI Output. The overall editing space occupied by the event list can be reduced to one line by dragging the horizontal dividing line upwards, or can be dedicated to the list by switching off all the other editors.

The "event list's graphic display" shows each event as a horizontal beam, allowing quick recognition of chords and doubled-up notes, and a quick overview over each event's relative position within the bar.

"Matrix Editor": shows each note as a vertical beam, the length of which represents the length of the note; it looks rather like a "pianola" roll.

"Hyper Edit": a highly-interactive, multi-use graphical tool for editing all kinds of events. It displays the contents of a track as vertical beams along a horizontal time axis according to certain conditions which you can define in "Hyper Edit Instruments": each Instrument can display one note pitch (taking the Channel into account or not), whose velocity is represented by the height of the beam; or one Controller number whose value is represented by the height of the beam; etc. The concept allows you to edit or create drum tracks, Volume tracks etc, using the mouse to "paint" the beams onto the screen.

NOTATOR's "score editor": displays notes as conventional notation.

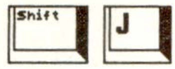
The event editor controls that have a global effect on all four editing tools within it are described in this Chapter and are:

- the three lefthand icons "QUANTIZE", "DE-QUANT", "DELETE"
- the righthand block of control icons:
- "CATCH", "CUE", the up/down screen cursor arrows
- "CHORD", "MIDIOUT", "MIDI IN", "INS-MODE", "CYCLE", "STEPINP"
- "UNDO"

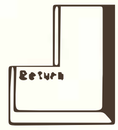
2. Accessing and quitting the editors; keystroke commands

To enter a selected track's event editor click the "EDIT" icon (right of centre of main page) or press 'E'. The various editors will display the contents of the track.

When entering from an empty/uninitialized track, a "dialog box" will ask you to confirm that you wish to enter. It also gives you the option of clicking "No Message" which suppresses this dialog box for the rest of your working day. 'Shift-J' restores the dialog box to normal.

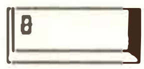


To leave the event editor click "OK" or the Atari "close window" box at the top left of the screen, or press 'E' or 'Return'.

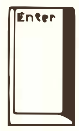


The dividing line between the event list and the other editors can be dragged up or down with the mouse pointer.

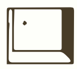
Whilst in the event editor, the



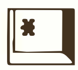
Start '0'



Stop 'Enter'



Pause/Continue '.' and



Record-delete '*'

functions remain as on the main page. Any CYCLE mode selected on the main page remains the same: you can switch CYCLE off with the 'C' key in the event editor.

The 'O' key solos the current track as on the main page.

The 'A' key switches the arrange mode on/off as on the main page.

'G' switches the event list's graphic display on/off, 'K' opens/closes the Matrix editor, 'J' opens/closes Hyper Edit, 'N' opens/closes NOTATOR's score editor.

There are many other keystrokes available in the event editor - look in the event editor Keychart.

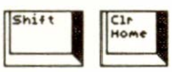
3. Event list positioning

To edit an event, the event must first be found. There are many ways to do so.

The event list "cursor" is a black rectangle whose location dictates which values will be edited.

The cursor can be positioned as follows:

- Screen cursor arrows up/down using either mouse button
- Computer cursor keys
- CUE icon, click and hold with either mouse button
- "Catch" mode, automatic
- Using other editors, like the score editor or Hyper Edit
- Dragging the "Atari GEM scroll box" along the righthand edge of the screen
- Clicking in the speckled bar of this "Atari GEM scroll bar"
- Using keystrokes 'Clr Home' or 'Shift-Clr Home' to jump to the start/end of the events.



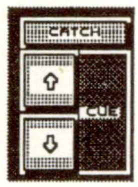
Where the search involves going to areas which are not on the screen, the event list will scroll: the cursor remains visible at all times, <u>and the event which is "under" it will play via MIDI.</u>

3.1 Screen arrows and cursor keys

The screen cursor arrows and computer cursor keys up/down will position the cursor in the current track and any movement of the cursor among the track's events will be heard via MIDI.

It is also possible to right-click either cursor arrow, which will reverse the direction of scroll (useful when the event list is reduced to one line and only the top of the up screen cursor arrow is showing!). Clicking and holding the arrows will give a continuous scrolling. Using both mouse buttons on the arrows will make the event list jump in steps without playing via MIDI.

3.2 CUE play with tempo control



One of the easiest ways to find an event for editing is by running the mouse pointer back and forth over the CUE icon, keeping the left mouse button depressed. This is a "super" version of using the screen arrows to step through events, and you hear the events of the current track only.

Clicking and holding the "CUE" icon with the right mouse button starts the sequencer from the current event's time position; as soon as the button is released, the sequencer stops. At the same time, the tempo can be decreased or increased by sliding the mouse backwards or forwards; the tempo returns to its original setting when you release the mouse button.

This plays the whole song, not just the current track (to hear just the current track playing in realtime, press 'O' to solo the track). In this respect CUE is a very convenient version of the usual CREATOR START/STOP commands.

So long as one of the mouse buttons is kept depressed, the mouse pointer can be allowed to stray from the CUE icon.

The CUE icon could become one of your most-used methods of seeking out events: scroll to roughly where you wish to hear the track with the left button on CUE, change over to holding CUE with the right button and move the mouse towards you to slow the music down for greater ability to pinpoint the problem event etc.

Tip: there is a difference between "CUE" and the standard "Pause/Continue" transport control:

- "CUE" (right-hold the CUE icon) starts/stops the sequence from the current (cursored) event. Keystroke: '#' (GB) or '\' (USA).
- "CONTINUE" (press '.') starts/stops the sequence from the current Main Bar Counter position.

3.3 CATCH mode

The CATCH mode locks the scrolling display to what is playing via MIDI: played events will be automatically followed by the editors.

Clicking the "CATCH" icon or pressing 'L' enables the CATCH mode. CREATOR/NOTATOR will cursor the event whose time position is nearest to that of the Main Bar Counter.

When you press START, this will happen automatically: CREATOR/NOTATOR will display the MIDI events of this track as they are transmitted over MIDI.

The CATCH function is disabled by pressing the cursor keys or by any form of clicking in the edit area - the display will then freeze where it is (reactivate with 'L'). In the score editor, use of 'Shift-L' will freeze the score cursor (reactivate with 'Shift-L' again).

If CATCH mode is enabled while the sequencer is stopped:

- scrolling the Main Bar Counter with the mouse
- using the '[' or ']' keys with 'L' afterwards
- using the Autolocator with 'L' afterwards
- using the ' ` ' key to type into the Main Bar Counter with 'L' afterwards (use this method to make large jumps) will make the editors jump to the new position.

As with almost all the other screen displays or commands, the CATCH function never affects the timing of the sequencer (thanks to the "priority-controlled multitasking"). The opposite, in fact: when a large number of events follow each other very quickly, the screen display may lag behind; as soon as the sequencer is stopped, however, the last event to have been played is immediately cursored.

3.4 Positioning and the editors

The event list cursor's position is affected by clicking a note in the score editor, a beam in Hyper Edit or a beam in the Matrix editor.

For more details, see each editor's section.

3.5 Atari GEM scroll bar

Down the righthand edge of the event editor, the white "scroll box" represents the visible portion of the event list, and the speckled bar represents the track.

Dragging the "scroll box" repositions the event list cursor.

Clicking the speckled bar above/below the scroll box scrolls the event list "page-by-page" up/down.

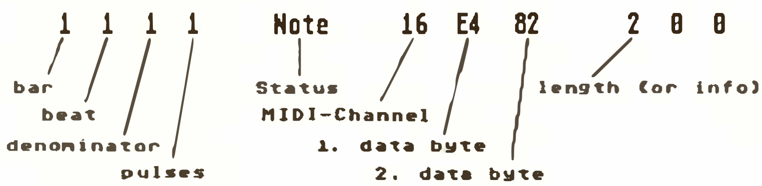
3.6 Jump to first/ last event

Pressing 'Clr Home' will make the event list jump to the first event of the track. 'Shift-Clr Home' makes the list jump to the last event of the track.

4. Event list's event line

The details of each event, MIDI or P_USER, are shown in the list, one line per event.

From left to right, an event is always seen as:



Time position:

- **Bar|beat|display format unit|internal resolution pulse**

or, if "Position in milliseconds" is switched on:
- **Hour|minute|second|millisecond**

or, if "Position in Frames" is switched on:
- **Hour|minute|second|frame|bit**

Event:

- **Status**
- **Channel**
- **"first data byte"**
- **"second data byte"**

Note length (notes only) or other information:

- **note length display follows the usual CREATOR/ NOTATOR "bar|beat|display format unit| internal resolution pulse" display.**
- **non-note events (Control, P_USER etc events) show information relating to their function.**

When time positions and note lengths are shown in bars, beats etc, the format of the display quantization (the FORMAT value in the information bar above) and the time signature will have an effect on the display.

Time positions shown as SMPTE time ("Position in frames") are calculated according to the current "Sync Reference" start time (called "SMPTE OFFSET" in the Sync Reference window) and tempo (with any changes).

SysEx and many P_USER events have no MIDI Channel value *(see previous Chapter)*.

"First data byte" and "second data byte" values have different meanings according to the "status" of the event *(see previous Chapter)*. They are always called "-1-", "ONE", "first data byte" and "-2-", "TWO", "second data byte" respectively. Channel Pressure and Program events make no use of the "second data byte".

With many SysEx events, the event list will show the name of the manufacturer, as a SysEx header includes the official International MIDI Association "Identity Number" unique to each manufacturer. If a SysEx event is not identified by the event list, it in no way means that event is deficient: the manufacturer's name is purely for your interest.

SysEx events are displayed as follows in the event list, after switching on the "Number Symbol" "#" in the event list edit filter (this "#" switch merely stops the display of values which one normally has no need to see - a SysEx event is still valid even if its full list of bytes is hidden from view when "#" is switched off):

- Header's time position
- Status ("SysEx")
- Manufacturer's ID
- Manufacturer's Device number (identifies the instrument)

```
1  1  1  1 SysExcl       67   0 Yamaha
...K".        0   1  27  75  34  26
%c_...       37  99  95   0   0   0
......        0   0   0   0   3   0
.a....        3  97   0   2   0   2
Z!.2cc       90  33  20  50  99  99
```

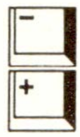
Each subsequent event list line carries up to six data bytes, with an ASCII translation to the left where the time position normally is (remember, these lines of data bytes have no official time position). The ASCII code is an internationally-standardized code of numerals and characters which are of particular value for synthesizers whose sounds have names. This name will then appear among the ASCII symbols, mainly at the beginning or at the end of a message.

The EOX event stipulated by MIDI Spec signals the end of a SysEx message: as it must always be present, it is not displayed in the event list.

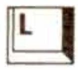
5. Editing in the event list

All the values you can see are editable by:

- **mouse clicking (left/right)**
- **using the "'Control' + mouse" feature**
- **using the "mouse-as-slider" function**
- **using the '+/-' keys**
- **direct typed entry from the calculator pad.**



Editing is possible during playback, and the sequencer will always play the most recent version.



The "CATCH" function ensures that the display follows what is played via MIDI during playback. As soon as a value is clicked or a key pressed, the display will freeze to allow editing to take place; clicking "CATCH" or pressing 'L' reactivates the "CATCH" function.

The calculator keypad allows direct entry of numerical values, eg to enter a Note's velocity of "82", ensure the cursor is on the "second data byte" and press '8' quickly followed by '2'. The '0' key is not interpreted as a Start command if it is entered after another number (eg "10"). To enter a value of "0" on its own, hold 'LeftShift' while tapping '0'.

This "calculator keypad" feature applies to every parameter of an event except for the time position; note lengths can only be entered in terms of 1/768th notes (eg 1/16th is "48"); Note pitch values are entered by giving the pitch's MIDI note number (eg C3 is value 60)*(see section 5.7 on Note length)*.

5.1 Altering an event's time position

The order of events in the event list reflects the order in which they are sent via the MIDI Output (events at the top of the list are sent first). Changing an event's time position (say, from bar 3 to bar 20) leads to an immediate "refreshing" of the event list as the event is scrolled: the cursor will always stay with the event as it scrolls, and the event will always stay in view - it's its relative position in the list that is changed.

Very large jumps in time are best done using the "'Control' + mouse' function as it is quicker.

Ensure "Insert mode" is switched off or you will find yourself scrolling the whole of the rest of the track as well! *(see section 5.1.2 Insert mode)*

Within a genuine chord (where notes share the same time pulse), the lowest-pitch note is the highest placed in the chord's event list, the next-lowest gets the second position, and so on.

5.1.1 Global position

When "Global Position" in the "Edit" menu is ticked, events' time positions are displayed relative to the start of the arrange list (arrange mode "ON").

This feature is used in conjunction with the arrange mode. If the arrange mode is switched off, "Global position" has no effect: events' time positions are shown relative to the beginning of the current pattern.

It can be very useful when you are working in the arrange mode, since you can choose to view events according to their position in the song. Normally, with "Global position" switched off, you are viewing events relative to the start of the current pattern itself.

For instance, the events of Intro pattern 16 starting at the beginning of the arrange list will have quite different "Global positions" to those in Re-intro pattern 16 if it is reintroduced halfway through the song (although within the pattern their positions will be identical).

When using "Global position" it is vital at all times, before you enter the event editor, to place the arrange list cursor ON the pattern you are about to enter.

5.1.2 Insert mode

Insert mode is switched on/off by pressing 'Shift-I', clicking the "INSMODE" icon to the right of the list or selecting "Insert Mode" in the "Edit" menu.

When Insert mode is enabled and the time position of an event is altered in the event list, all the events that follow it will be correspondingly shifted in time with it.

You can use this, for instance, to create a gap in the middle of a track, or to move whole a track by altering just the first event's time position (very useful where the player has started late after the count-in, and needs to be brought back to the "1 1 1 1").

You should be careful when making the time position of an event earlier, because if you go too far you will merge the moved events with the existing ones, and may find it difficult to move these events back to their old positions ... but UNDO should save the day.

GOLDEN RULE: always switch Insert mode off immediately after using it to avoid accidents!

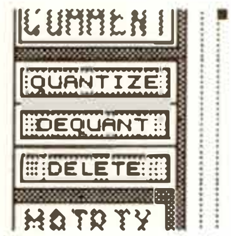
5.1.3 "Pickup Clock"

In the event editor, the "slash" key '/' in the calculator keypad forces the Main Bar Counter position onto the current event at the exact time of pressing '/'.

Typical application: assigning sampled sound effects to specific points in a video. To do this: assemble in the correct order, the list of notes that will trigger the samples which will relate to the visual cues, then sync up CREATOR or NOTATOR to the video and press '/' at the correct cue points. The cues' time positions can then be "fine-tuned" afterwards by direct clicking.

It makes sense to have Insert mode enabled to ensure that the list remains in the same order throughout the operation. *Also, you may find it necessary to assemble the initial list using time positions later than those you will be actually using to avoid the list scrolling as soon as you start the video.*

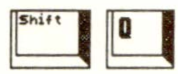
5.1.4 Quantize/ de-quantize single events



The time position of one event at a time can be quantized to the selected display format by clicking the "QUANTIZE" icon to the left of the event list or pressing 'Q'.

This can allow each event to have a different quantize resolution within the track.

It is not the current time position of the event that is altered (which may have been quantized previously via the QUANTIZE track parameter), but the original position of the event when it was first recorded: it can, for example, make sense to quantize a track with the QUANTIZE track parameter on the main page to 1/16 and after this to "re-quantize" individual events in the event list to 1/12 to restore the precise "feel" you require.



The time position of one event at a time can be dequantized by clicking the "DEQUANT" icon to the left of the event list or pressing 'Shift-Q'.This restores the event to its original time position *(see also Chapter 17: "QUANTIZE, ...")*.

5.2 Status

In the event list, the status of "Control", "Program", "C-Press", "P-Press" and "PitchWheel" events can be altered by double-clicking the status name or using the "'Control' + mouse" function.

The two types of event that define the end of a note ("NOTEOFF" and "NOTE with Velocity off") need seldom to be seen in the event list: their display is therefore normally left switched off in the event filter. Their MIDI Channels are automatically changed if you change the Note On's Channel, their pitches change with those of the Notes' and their time positions are automatically changed when you alter a Note's length.

However, when their display in the list is enabled, double-clicking one type of Note Off event converts it into the other type.

5.3 Channel

You can edit each event's MIDI Channel value in the event list in the "CHANNEL" column. This value shows the Channel of the event when it was first recorded (and is normally the transmit Channel of the master keyboard).

It is almost always overridden by the CHANNEL track parameter on the main page which, being a "playback" parameter, is the value which decides which instrument is being addressed by the current track.

Having a Channel value becomes very useful in certain functions such as Cycle recording *(Chapter 7)*, and NOTATOR's Polyphonic function *(Chapter 11)*, as it allows the program to distinguish between notes of different Cycle layers or different Polyphonic voices.

SysEx and most P_USER events have no Channel value.

5.4 "First data byte" (-1-)

This event list column is where you alter "first data byte" values:

- NOTE: pitch
- Control: number (information column displays its name)
- P_USER: number (information column displays its name)
- C-Press: amount
- P-Press: pitch
- Program: number
- PitchWh: amount (value ignored by most synths)
- SysExcl: manufacturer ID (info column may show IMA name)

5.5 "Second data byte" (-2-)

This event list column is where you alter "second data byte" values:

- NOTE: velocity
- Control: amount
- P_USER: amount/value
- C-Press: (not used)
- P-Press: amount
- Program: (not used)
- PitchWh: amount (this is the value normally used)
- SysExcl: manufacturer Device Number

5.6 "MIDI In"

If the "MIDI IN" icon to the right of the event list is on, or "MIDI In" is selected in the "Edit" menu, then the MIDI master keyboard can be used to enter certain values.

For example: place the event list cursor on a note's Velocity value (the "-2-" column) and play the keyboard - your playing updates that note's Velocity. If the cursor is on the Pitch column "-1-", the pitch is updated. If the cursor is anywhere else, both Pitch and Velocity are updated.

The same can be done with Control events (number and/or amount), "Channel Pressure" (amount), etc.

5.7 Note length

This event list column is where you may alter note lengths (this automatically moves the Note Off position).

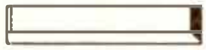
Note lengths can be typed in via the calculator keypad in pulse units, according to the overall sequencer internal resolution.

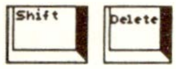
Conversion table of 1/768 and 1/1536 pulses to bar, beats etc:

Note length:	1/1	1/2	1/4	1/8	1/12	1/16	1/24	1/32
Pulses (768):	768	384	192	96	64	48	32	24
Pulses (1536):	1536	768	384	192	128	96	64	48

Where you try to increase the length of a note, and the program detects another note of the same pitch and Channel after it, you will not be able to increase the length of the earlier note beyond the start of the second note *(see Chapter 30: "APPENDIX", section 1.7)*.

6. Deleting single events





In the event list, pressing 'Delete' or clicking the "DELETE" icon will mark the cursored event as having been "deleted": using the 'Spacebar' or quitting the event editor will clear it from the list. This helps speed up the deleting process.

Alternatively, you can drag the event (cursor on STATUS column) to the left edge of the event editor and release the mouse button.

Other ways to delete events include "fast delete" ('Shift-Delete') and use of "Delete/Keep Events" in the "Functions" menu *(see relevant Chapters)*.

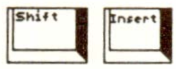
7. Copying single events

A single event can be copied within the event list by dragging it up or down (use the STATUS column to drag it) and releasing it.

8. Entering events from the event list filter

An event can be introduced into the event list by dragging the relevant icon from the event list filter at the left of the list and releasing it in the list area.

Releasing the event exactly on top of an existing one will place it at precisely the same time position.



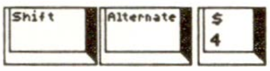
The 'Insert' key will introduce a Control event into the list (which can then be double-clicked to change it to another status), and 'Shift-Insert' will enter a note.

9. Entering SysEx events

A SysEx header can be dragged into the list from the event list filter by dragging the "SysEx" icon. There is no MIDI Channel, the "first data byte" defines the manufacturer, the "second data byte" normally defines the Device Number.

To create the further "data bytes", enter a second SysEx event from the event list filter and drop it exactly on top of the existing one (click the "number symbol" "#" in the event list filter on first): this creates a line of six bytes. To create further lines, drag the header and drop it exactly on top one of the existing data byte lines.

To remove a byte, place the cursor on it and press 'Delete' or double-click it whilst holding 'Shift'. To add a byte, simply click in the appropriate space.



Each line of bytes is displayed as ASCII symbols down the lefthand columns, and pressing 'Shift-Alternate-$' displays values in Hexadecimal.

10. Entering Text events (P_USER 60)

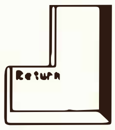
The 'Esc' key in the event editor will enter an independent P_USER 60 event in the track and open a text-entry window for you to type in your text. Pressing 'Esc' or clicking the event when the event list cursor is already on a P-USER 60 event allows you to access that text for editing.

Entering the TEXT or LYRIC icon into NOTATOR's score editor has the same effect.

If the "number" symbol "#" in the event list filter is switched off (grey), the text/lyric will be shown on the same line just to the right of the time position, once you have typed it in. In NOTATOR, there is an additional font style number 1-16 in the information column. Switching "#" on will display the text event in its entirety.

The following keys control text input:

- 'Return': ends inputting of text

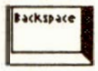


- Cursor keys: control movement of cursor

- 'Esc': deletes all characters

- 'Delete': deletes character under cursor

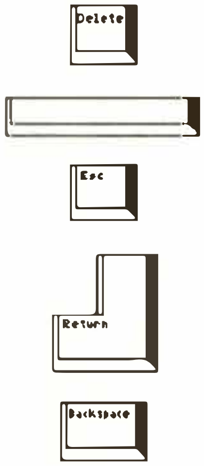
- 'Backspace': deletes character to the left of cur sor



- 'Insert': inserts space under cursor.

As the text events are part of the event list, you have the makings of an "auto-scrolling text". When the event list scrolls in playback mode (if necessary click "CATCH"), your text will scroll too.

Deleting text:



- drag the P-USER 60 from the event list to the lefthand edge of the event editor
- press 'Delete' then 'Spacebar'

- press 'Esc' to open the text window, 'Esc' again to wipe the text then 'Return'

- in NOTATOR, drag the text itself to the edge of the score editor

- in NOTATOR, select the text and press 'Back-space'.

11. "Comment" function

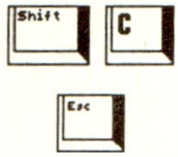
In addition to the independent P_USER 60 text events, you are able to create "text extensions" to certain types of event.

With the cursor on an event in the event list (not SysEx or P_USER), press 'Shift-Esc' and type in text: if "COMMENT" in the lefthand event list filter is enabled, this text replaces any event list information to the right of the event's STATUS name, and is now indivisibly part of that event: move the event, and you move the text.

```
1  1  1  1 any comment on events
1  1  1  1 NOTE     1  E3   64        1 47
```

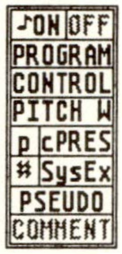
Example: to name a PROGRAM event, click it, press 'Shift-Esc', type eg "FUNK BASS 3", click "OK", ensure "COMMENT" is on.

To view the original event, click COMMENT off (or press 'Shift-C'). To edit a text-extension, click it in the event list or press 'Shift-Esc'. To delete a text-extension, open it up, delete the characters with 'Esc', then click "OK".



Text-extensions are visible in the event list only, not in the score editor.

12. Event list display filter



Events in the event list can be selectively hidden from view.

The box of icons to the left of the event list does two jobs: it acts as a source of single events, as we have seen. It also acts as a display filter for the event list: by clicking the icons, you can decide for each status type whether it should be displayed (normal typeface) or hidden from view (grey typeface). This means being able to have a clear overview over the track's contents.

The display filter controls only what you see on the screen - event types not displayed are still transmitted over MIDI and are not deleted.

The display of the event list can be freely selected. If you require for example a pure "note list", disable all the icons with the exception of the Note On one. Other possibilities are for example a pure "Pitchbend" list, a pure "Channel Pressure" list or any combinations you can think of.

The additional data bytes in SysEx messages can be removed from the display by disabling the "number" "#" symbol.

The same goes for P_USER events' additional information, with the exception of P_USER 60 (Text) and P_USER 61 (Lyric), where the text will be shown to the right of the event's time position.

As you change the display filter configuration, the event under the cursor will always remain visible, even if the event is one that should become filtered: this avoids the cursor jumping in time to the next event, and the event anyway disappears next time you scroll the event list.

"(Missing)" Note Offs:

Note Off events are normally not displayed in the event list, as the program will automatically insert a Note Off whenever a Note On event is introduced. However, if you have a track which contains Note Ons with missing Note Offs (the event list will show "(missing)" in the length column), you should use the "Check" function which will insert the missing events for you.

Tip: to filter the MIDI output of events from a track, use the "Output Filter" (see Chapter 6: "TRACKS", section 3.10).

13. Event list's graphic display

To the left of the event list, each event in the list is represented as a horizontal black beam sharing the same line as its event; each event is on a separate line.

The background is a time grid, whose lefthand edge is the beginning of the bar. The solid vertical lines represent the beats within the bar, numbered above. The grid shows up to six beats from left to right. The beat lines depend on the metric signature. The dotted vertical lines represent the "display format" (in CREATOR/NOTATOR, each beat is normally split into 4 1/16ths, though this can be changed in the FORMAT box in the information bar above); where the display format is 1/24 or higher, the dotted lines represent whole fractions.

The left end of an event beam shows the point in time, within the bar, of the event's beginning: the exact position is displayed in the event list, right.

The graphic display's job is to show, at-a-glance, events' relative positions within a bar.

The length of an event beam represents a note's length (non-note events have no length as such, and are portrayed as short "blips" on the matrix). Because it is not really the graphic display's job to show relative lengths (use the Matrix editor for this), some notes' lengths will disappear beyond the righthand border: their exact lengths are displayed in the event list to the right.

One "Pixel" dot on the screen represents a 1/96th note.

The event list graphic display is a great way of spotting chords and mistakes such as doubled notes.

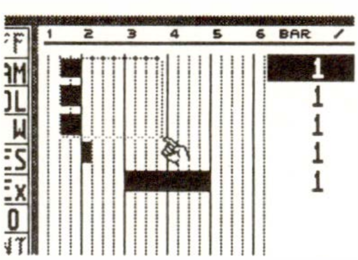
13.1 Manipulating the beams

Although you are able to directly edit the time position of an event by dragging the graphic beam left or right, this graphic display is more suited to giving you a visual feed back of the information in the event list to the right. If you prefer to work graphically, use the MATRIX editor which is designed for interaction with the mouse, or Hyper Edit.

If you really want to use the graphic display for editing, you can change a note's length (non-note events have no "length") by dragging the graphic beam left or right (keep the left mouse button depressed at the beam's lower right corner - pointer changes to a finger).

To change an event's time position within the bar, click-hold the beam itself (pointer changes to a hand) and drag the beam left or right.

13.2 Giving chords' notes the same length



In a chord, after click-holding the top beam's lower righthand corner, the mouse pointer can be dragged downwards to include the other notes in the "lasso", and left or right to increase/decrease the length: when you release the mouse, the selected note length will be copied onto the following notes without altering those notes' time positions. This "length copy" feature is designed to help give notes in a chord the same length.

14. MIDI Step Input

When "MIDI Step Input" in the "Edit" menu is selected (or click the "STEPINP" icon to the right of the event list or press 'Shift-K'), you can use your MIDI master keyboard to enter notes into a track's event editor step-by-step while the sequencer is stopped, without being in record mode, and therefore without metronome. Notes can be entered singly or as chords; only when the last key of a chord is released will the program step forwards.

'Tab' acts as an "empty step" or "rest" command: it steps the sequence on by one FORMAT unit (CREATOR) or one note value (NOTATOR).

MIDI Step Input is useful in many situations (such as entering "unplayable" runs etc).

CREATOR and NOTATOR have different MIDI Step Input methods:

CREATOR:

The time positions of notes depend on the "FORMAT" setting in the information bar above, and on the note length.

With format 1/16, the input notes will be no closer than 1/16th to each other, with format 1/8, notes will be no closer than 1/8th note to each other, etc. This is true so long as the lengths of the notes are no longer than the display format value.

In reality, the lengths of notes when step inputting are of little relevance, so if you keep the note length short, you can change the FORMAT value without touching the note length and get the full benefit of being able to change FORMAT when you like, changing from 1/16ths to 1/8ths to 1/32nds etc just by changing the FORMAT.

Example:

- enter your first note. Ensure it is where you want it. If not, scroll its time position with the mouse.
- In CREATOR, it defaults to being exactly 1/16th in length ("__ __ _1 _0").
- This is too long: even at FORMAT 1/16, it will only allow notes every <u>other</u> 1/16th because CREATOR always likes to have at least one pulse space between notes (a length of 47 pulses would allow consecutive 1/16ths, but you would need to halve this again if you wanted consecutive 1/32nds). So:
- your first action should be to reduce the length of the note to, say, 20 pulses and to increase the velocity if you wish.
- By editing that first note, you have interrupted the flow of input: if you played another note now, it would be input at the same time position. If this is what you want, fine.
- But if you want the next note to be 1/16th later, <u>click the current note in the event list where it says "NOTE",</u> press 'Tab' with the FORMAT at 1/16, then play the next note.
- After this, carry on inputting.

Two tips: if you make a mistake, the best thing is to carry on inputting and manually correct later; and whenever you do correct or edit a note in any way, or wish to go back and add a second line, always click the status of the note nearest to where you wish to restart: this tells the sequencer where it is and gives it its start point for 'Tab' or more inputting.

NOTATOR

The time positions of notes depend on the selected note in the lefthand partbox. NOTATOR's Step Input is somewhat simpler than CREATOR's.

The FORMAT has an influence on what is displayed, but only in the usual sense that it puts a "ceiling" on the shortest value: you do not need to touch it, except that you might like to select 1/96 to allow any note value.

Example:

- enter your first note. Ensure it is where you want it. If not, scroll its time position with the mouse.
- It defaults to 1/16th in length, less one pulse: 47 pulses.
- This length is correct because the program always likes to have at least one pulse space between notes.
- Continue inputting notes, choosing their values in the partbox. 'Tab' will adopt a step length equivalent to the selected note in the partbox.
- If at any point you need to correct a note or go back and add a second line, always click the note on the stave nearest to where you wish to continue from, then press 'Tab' or continue inputting. This ensures the sequencer knows where it is starting from.

Two tips: if you make a mistake, the best thing is to carry on inputting and manually correct later; and whenever you do correct or edit a note in any way, always finish by clicking the note on the stave: this tells the sequencer where it is and gives it its start point for 'Tab' or more inputting.

15. "MIDI OUT"

If the "MIDI OUT" icon is active (right of the event list, or tick "MIDI Out" in the "Edit" menu, or press 'Shift-O'), you will hear any editing you do via MIDI.

You may find it advisable to disable this function when working on Control, P_USER, Program or SysEx data to avoid sending MIDI data to your device before you are ready to do so. Also, it means you can edit a track during playback without hearing your editing at the same time.

16. "CHORD"

When the "CHORD" icon is enabled (right of the event list or tick "Chord" in the "Edit" menu), all notes starting at exactly the same time position will be played over MIDI simultaneously.

This enables chords to be singled out from the mass of other events.

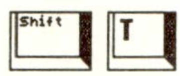
17. "CYCLE"

When the "CYCLE" icon is clicked on (right of the event list, or tick "Bar Cycle" in the "Edit" menu), the sequencer will cycle around the bar in which you have clicked the cursor.

18. "Fast Transform" function

This is a very useful way of quickly editing data and applies to the CHANNEL, "first data byte" (-1-), "second data byte" (-2-) and note length columns in the event list.

Pressing 'T' when the event list cursor is on a value in one of these four columns will copy that value to the following event of the same status.



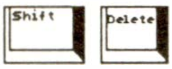
Pressing 'Shift-T' when the event list cursor is on a value in one of these four columns will copy that value to the all the following events of the same status.

Example: all notes should receive a note length of 24 pulses from bar 5:

- go to the first note in bar 5 and change its length to "24"
- press 'Shift-T'.

19. Fast Delete/Keep

This is a fast way of deleting whole "statuses" of events that avoids using the "Delete/Keep" menu option.



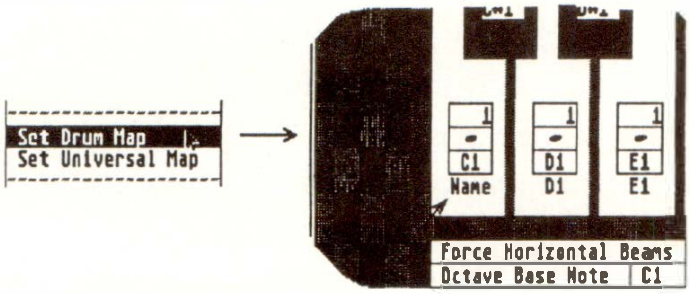
With the event list cursor on an event (eg "C-PRESS"), press 'Shift-Delete' to delete all the events that share the same status in the track eg all "C_PRESS".

With Notes, this command will only delete all notes that share the same pitch. With Controllers, this command will only delete all Control events that share the same Controller number. With P_USER events, this command will only delete all P_USER events that share the same P_USER number.

In contrast to this, 'Alternate-Shift-Delete' on a Note will Keep all the notes that share the same pitch and Delete all other notes; with Control events, it will likewise Keep all the Control events that share the same Controller number and Delete all other Control events; with P_USER events, it will likewise Keep all the P_USER events that share the same P_USER number and Delete all the other P_USER events.

Note that to keep one status and delete all the others, you have to repeat the "Delete" command for each status you want to delete until you are left with the one you want to keep.

20. "Mapped Drum" mode



It is often convenient to be able to give names to events in the event list, especially where drum notes are involved.

With "Set Drum Map" in the "Options" menu, any MIDI note can be user-named in the event list. The naming applies to the whole song globally, but can be enabled for each track separately.

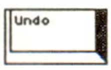
NOTATOR has an enhanced version of the Set Drum Map window, more fully described in Chapter 11, section 26.

The Set Drum Map window represents the complete range of MIDI notes, one octave per screen. Find out which of your drums is played by which MIDI note; the window allows you then to enter a four-character name on the appropriate note, replacing the existing pitch display. For example, if the snare is played by D3, scroll the "Octave Base Note" to "C3" and enter the name "Snre" where the graphic key shows "D3".

Once you have named the drums, click "OK" to quit the window: you can now choose in which track(s) you want to view the names: "Mapped Drum" in the "Edit" menu replaces the notes' pitches in the event list with the new names, for that track. If you have not entered a name for a note, the default note pitches which are on the graphic keys in the Drum Map window ensure that the displays of unassigned notes remain unaltered.

Drum Map parameters are saved with a Song. You may find it useful to include the Drum Mapping in your AUTOLOAD.SON.

21. UNDO in the event editor



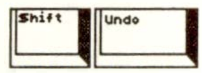
The UNDO function not only reverses the deletion or recording-over of tracks: it also reverses, with certain exceptions, all event-altering operations. Even UNDO itself can be reversed, which means that the old and the new versions can be toggled.

So far as UNDO is concerned, the event editor is one large event-altering function - all alterations in the event editor are reversed by clicking the UNDO (right of the event list or press the 'Undo' key). Quitting the event editor "fixes" its values, making them no longer UNDO-able.

A certain amount of care is needed when using UNDO in the event editor: when conducting delicate editing operations it is worth working methodically and logically to avoid the following situation: if you alter a value, but wish subsequently to reverse your decision, you use UNDO. If you alter another value which you then wish to reverse, UNDO will indeed do this, but at the same time it will "re-reverse" the first value.

If you are conducting an extensive editing operation in the event editor it makes sense to press 'E' twice whenever you have made an important change which you would not wish to have re-reversed if UNDO were used again: the action of leaving and re-entering is to fix the alterations at the values in force when you leave the event editor.

UNDO will not necessarily restore you to the position you were at when you first entered the event editor.



Pressing 'Shift-Undo' has the effect of reversing any changes that have been made to date and fixing them there, so preventing them from being reversed yet again should UNDO be used.

22. Event editor examples

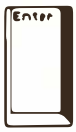
Task: at the beginning of bar 4, the synthesizer is to switch to Program number 27.

Solution 1: to achieve this, a MIDI Program Change command must be inserted into the event list. First click the desired track of the pattern and then click "EDIT" - the event editor will appear. Use the mouse to drag an event from the PROGRAM icon of the event list filter to the event list. This has the effect of inserting a new event with a Program status. Select the position and number in the "-1-" column.

If "MIDI OUT" is enabled while you are doing this, the program number is instantly transmitted via MIDI and received by the synthesizer (ensure that "Program Change Enable" in the MIDI device is "on"). The line in the Event Editor should read eg: "4 1 1 1 Program 1 27".

Solution 2: in record mode, you can record Program Change events that arrive from your MIDI devices; once in a track, you can edit the number and time position in the event list.

Solution 3: with "Hyper Edit" (press 'J'), define a Hyper Instrument to show Program Change events, click the event at the desired position and move the inner beam vertically to select the Program number.



Solution 4: with the "RMG": in main page, select an empty track, press 'M' to enter the RMG, switch the window to status "Program", press 'Spacebar' to enter record mode without starting, move each fader in turn to the correct number for each Channel, press 'Enter' to stop recording: the events are now in the current track and can be further edited if required.

Task: all three notes of a chord should receive the same new length.

2	1	1	1	Note	1G3	88	1	1	1
2	1	1	1	Note	1C4	92	1	1	15
2	1	1	1	Note	1E4	104	1	0	37

Solution 1: set the new length in the top note, then press 'T' twice to transfer that length to the other notes.

Solution 2: in the event list's graphic display, click-hold the lower righthand corner of the top note's beam; drag it downwards to cover the other two notes (and right or leftwards to increase/decrease the length); release the mouse button.

Task: when you copied a segment of a track, you missed the "Pedal Off" event (Controller 64, value 0) so that all the notes sustain on.

Solution: drag a Controller out from the CONTROL icon, left of the event list. Select the position, and scroll the "first data byte" to 64, the "second data byte" to 0.

In NOTATOR, you simply drag in the "Pedal Off" symbol and place it where you want it under the stave.

Use the same method to correct other problems, such as inserting or moving a "Pitch Wheel Off" event to bring a synth back to the right pitch at the desired place, for example:

5 1 1 1 PitchWh 1 0 64

(The "second data byte" is the one usually used: 64 is resting, 0 is lower, 127 is higher.)

Task: you want to give all notes the same velocity from a certain note onwards.

Solution: place the cursor on the relevant note's velocity value and press 'Shift-T'.

Pressing 'T' on its own would copy the value to the next event only. Note that in most cases, the "VELOCITY" and "COMPRESS" track parameters are far preferable (reversible, changeable, quick), but they affect the track from beginning to end.

Task: you want to make a track start one bar earlier (you thought the count-in was two bars long, whereas it was only one bar, so you started a bar late!).

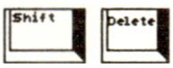
Solution: Press 'Shift-I' to enable "Insert mode", press 'Clr Home' to ensure the event list cursor is on the first event, and right-click the first event earlier in time by one bar by clicking in the "BAR" column: all events, notes and others, will move together.

Don't forget to switch "Insert mode" off again after use!

"Insert mode" is especially useful when you are viewing events in "Position in frames" mode when creating video cues etc.

There are many other ways to move data about: Segment Copy, Track DELAY, Pattern DELAY, "Cut Inside/Outside Locators" etc.

Task: you have recorded your master keyboard's Aftertouch data which you don't need.



Solution: to delete all the "C-Press" events from the track, place the event list cursor on one of them and press 'Shift-Delete'.

Alternative solutions:

- To stop the events from being sent without deleting them, use the track's "Output Filter" by right-clicking the track's status column on the main page and switching off the "C-Press" icon.
- To stop the events from being displayed in the event list, switch off the "C Press" icon in the event list filter to the left.
- To stop the events from ever being recorded, switch off the "C Press" icon of the relevant MIDI Input in the "Input Handling" window ("MIDI" menu).

The above examples show how to use the event editor to solve tasks. More complex tasks are often best solved by other means. For example, if you wish to simultaneously change velocity and limit the changes to a certain zone, use the "Process Data" function. If you want to be more precise, such as giving a velocity increase to snares on the second beat of each bar only, use the "Transform" function (see Chapter 24: "TRANSFORM").

10. Score Editor: Basic Functions

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SCORE EDITOR: BASIC FUNCTIONS

10

1. The basics

NOTATOR's notation is based around its ability to directly convert MIDI notes into conventional score. The score always shows the events of the current track. Edits you make to the score with the mouse are as instant as if you were editing the event list itself.

You do not have to imagine what is happening to a note while editing. In NOTATOR, you simply grab the note itself and transpose, move, copy or delete it directly, while simultaneously hearing the result via MIDI.

The notation can be altered by various display parameters. These include the "display format", clef, key signature, double-stave split point etc. Most display parameters affect the track as a whole. There are also many functions that allow changes to the display of individual notes.

The score editor includes various graphic symbols that can be freely entered and manipulated along with a track's MIDI events. Some of these can actually affect the MIDI data (Pedal, Accent and Staccato signs). Comprehensive Text and Lyric functions allow text to be entered where desired.

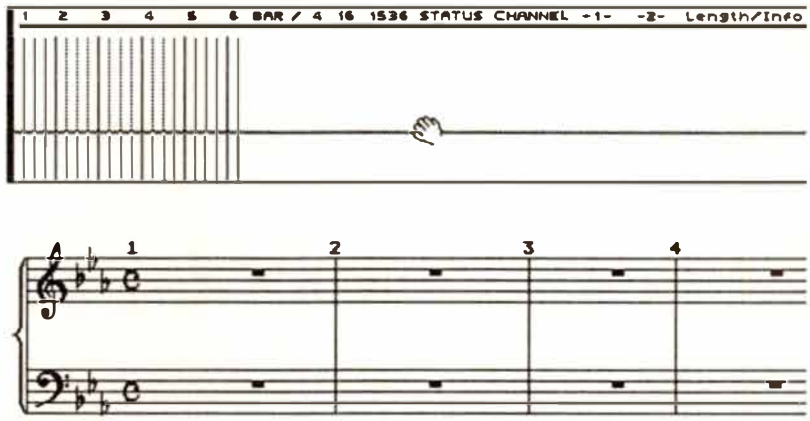
2. Switching on the score editor

Clicking the "EDIT" icon on NOTATOR's main page or pressing 'E' enters you into the event editor, of which the score editor is one of the four editing tools.

The score editor exists below the event list with its graphic display, and includes the "lefthand partbox" of symbols. It can also run with Hyper Edit. The score editor can be switched off/on with the 'N' key or via "Note Display" in the "Edit" menu.

3. Dividing the screen

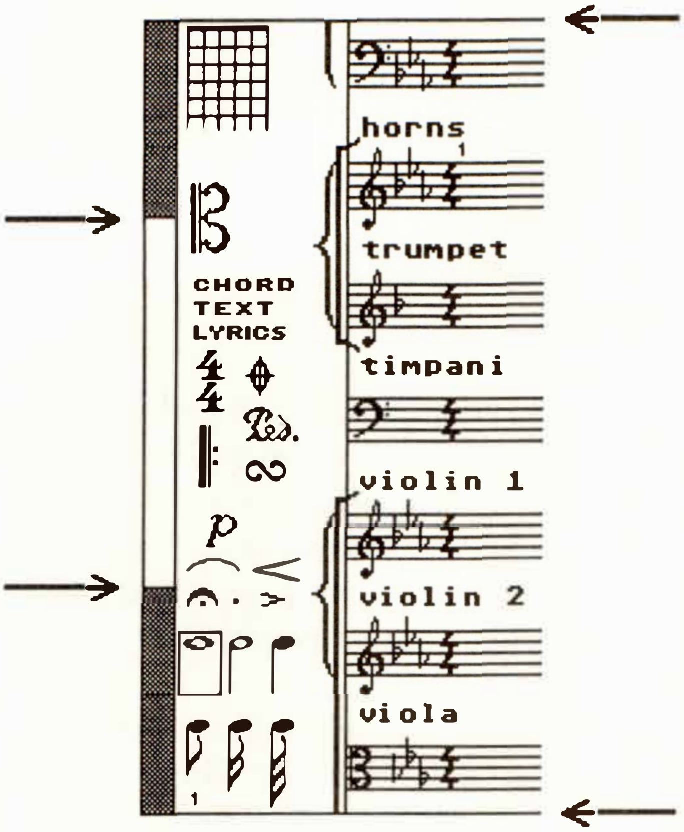
The dividing borderline between the event list and score editor can be freely moved: drag the borderline itself up or down to the required position.



The event list display can be reduced to a <u>minimum</u> of one line so that you are at least able to see the event values of the selected score object.

An "object" is anything in the score editor: note, symbol, text etc.

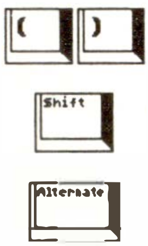
If the score editor part of the event editor is not big enough (eg in "Full Score" mode) a "scroll bar" will appear down the lefthand edge of the score editor, with which the score can be scrolled vertically.



Dragging the white "scroll box" in this scroll bar with the right mouse button will have the effect of updating the display only when you release the mouse button. Dragging the scroll box with the left mouse button allows you to see the staves scroll, complete with their track names and clefs.

4. Positioning within the score editor

The score editor will always show "where the action is". Whether you use the mouse, use the "CATCH" or "CUE" functions or the scrollbar down the right-hand edge of the screen to select an event, the score editor will update to reflect the new position. And vice-versa, clicking a score object will move the event list.



The bracket keys in the calculator keypad move the score display bar-by-bar without affecting the Main Bar Counter or event list. Pressing 'Shift' at the same time moves the score in beat steps, and pressing 'Alternate' at the same time moves the display in "display format" units (usually 1/16ths).

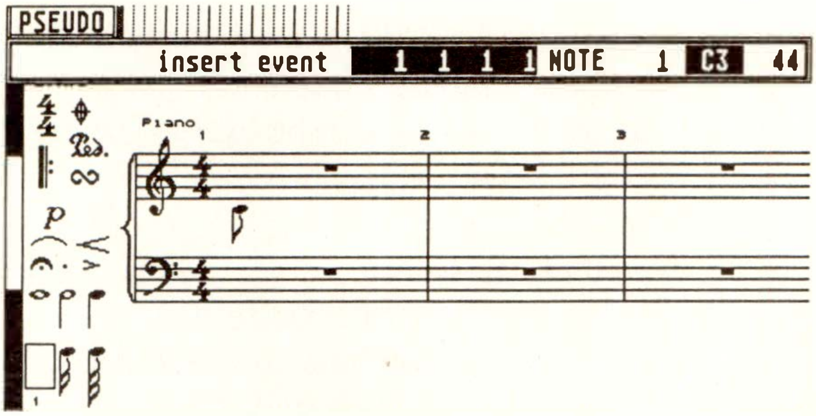
'Clr Home' makes the event editor jump to the first event in the track, 'Shift-Clr Home' to the last event.

5. Entering objects into the score editor

There are two "partboxes" at your disposal, containing the objects you can enter with the mouse onto the stave.

Whenever you enter an object, the "Control Line" will appear above the score editor giving the exact data of the object you are entering.

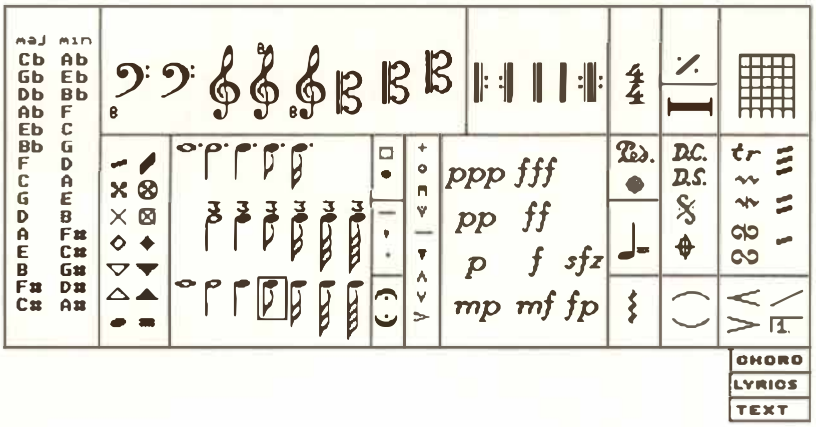
5.1 Entering from the lefthand partbox

The lefthand partbox is always visible to the left of the score editor. It contains a selection of the most commonly-used objects. The objects are grouped in "families", each family showing one object at a time; the other objects are selectable by clicking the visible object. To enter an object, drag it from the partbox with the left mouse button onto the stave and release where desired.

Fast insertion: if the desired partbox object is already selected (surrounded by a frame), clicking and holding the right mouse button will make the object fly to wherever the mouse pointer is, allowing you to quickly enter notes etc without having to move the mouse pointer to the partbox each time.

5.2 Entering from the pop-up partbox

The large pop-up partbox is opened by touching the bottom edge of the screen with the mouse pointer. It contains all the score objects, simultaneously visible.

To leave the partbox without selecting anything, just touch the bottom edge of the screen with the mouse pointer again or move the pointer outside the partbox.



To select an object from the pop-up partbox, click-hold it with either mouse button: the partbox vanishes, and the object can then be entered onto the stave.

At the same time, the selected object will be loaded into the lefthand partbox to indicate that all subsequent right-clicks will continue to enter the same object, until a fresh one is selected. This is so, even if the current display is such that you cannot actually see all of the lefthand partbox.

5.3 Disabling the pop-up partbox

The automatic "pop-up" action of this partbox can be disabled by right-clicking the bottom edge of the screen: the partbox will now appcar only when you left-click the bottom edge of the screen. Right-clicking the bottom edge of the screen again will re-enable the automatic pop-up action of the partbox.

5.4 "SNAP" function

While entering an object from either partbox, you are able to select a special mode that "SNAPS" objects into particular time, pitch or page positions. "SNAP" can be turned on and off by additionally clicking the other mouse button while the first one is being held, while entering an object.

There are three uses to which SNAP is put in the score editor. When you enter an object, NOTATOR defaults to the last mode (SNAP on or off) that you used (watch out for the word "SNAP" in the Control Line - if it is not there, SNAP is off).

Time SNAP: the object may only be entered into a time position at which there is already a note or rest (this also depends on the value of the note being entered).

This helps you to enter notes more quickly and with greater precision than in the standard mode, which allows you to enter notes almost anywhere.

Diatonic SNAP (notes only): in addition to Time SNAP, SNAP will also only allow the note to be entered at the note pitches of the current key signature.

This also speeds up the entry of notes onto the stave since chromatic notes are suppressed. Disabling SNAP allows full access to every semitone.

Text/Lyric SNAP: when entering text or lyric events, SNAP will force the event to align itself along one of the many "SNAPlines" that run, invisibly, horizontally across the screen.

They are each separated by 12 screen pixels. These SNAPlines ensure that all text/lyric events are aligned even if you continue a line of lyrics on from the end of an existing line, or that any additional lines (eg of a verse) are regularly spaced down the page.

SNAP is vital with lyrics and should always be used. When continuing on from an existing line, simply enable SNAP and release the Lyric icon at the approximate height of the existing lyrics under the next note: SNAP ensures that the exact alignment is kept. When starting the second line of a verse, enable SNAP and release the Lyric icon approximately the height of one character below the existing one: SNAP ensures the distance between the lines is correct.

5.5 The "Control Line"

More information on what you can expect to see in the "Control Line" is given in the appropriate sections in the manual. This is a summary.

```
SNAP  insert event  1 1 3 1  NOTE  1  G2  68      1 94
```

Whenever an object is entered onto the stave, or is moved once it is on the stave, a boxed line of informative text appears above the score editor, telling you what is happening: the "Control Line".

- When entering an object, it gives you a time position readout of where the mouse pointer is, with the "event list" line relating to the object you are entering: if a note, the pitch readout is also given; the note length is set by the note value you have selected minus one pulse; the MIDI Channel of the object, where applicable, can be preset by altering the tiny number in the bottom left-hand corner of the score editor: the partbox Channel.
- When deleting, the Control Line will confirm the deletion when the mouse pointer has reached the score editor border, and give the number of objects being deleted.
- When manipulating objects already on the score, you are told the direction of the mouse pointer (transposing or moving in time), with the latest pointer position and the amount of offset from the original position.
- Other objects, such as slurs and crescendo "hairpins", give information on amount of bend, opening angle etc while you move the mouse.
- Dragging the stave, lower printing limit and header printing limit up and down tells you where you are in screen pixels, and how many lines you are allowing per printed page by moving these items.

6. Manipulating objects in the score editor

The score editor has a large number of functions for editing the display of objects. The most common operations involving transposing, moving, copying and deleting can be done with the mouse. Many of the display functions are accessible via keystroke commands.

6.1 Selecting objects

Most operations with the mouse involve "selecting" the objects first before manipulating them.

"Selected" objects blink.

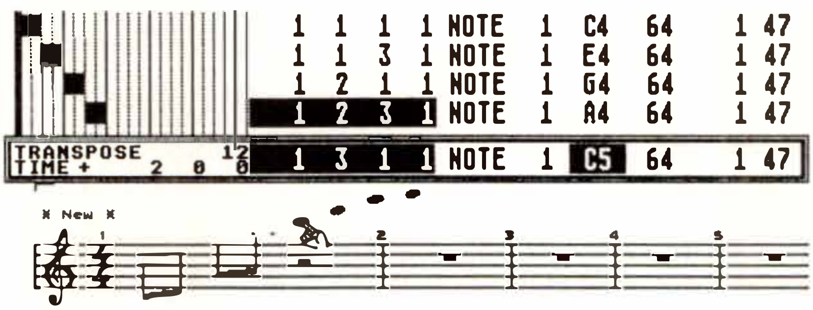
There are many ways of selecting objects:

- individual objects may be selected simply by clicking with the mouse: this deselects all other objects.
- holding 'Shift' at the same time as clicking objects allows you to select or deselect a number of them without affecting the objects you leave alone.
- "lassoing" a group (eg a chord or bar) of objects selects them: click-hold in a blank space near the required objects, keep the left button depressed and move the mouse in any direction so as to form a rectangular shaded box around the required objects, which will start to blink when the mouse button is released. All other objects will be de-selected.
  Keeping 'Shift' depressed will keep any already-selected objects in a selected state.
  "Lassoing" with the right mouse button with 'Shift' depressed de-selects the enclosed objects.

- individual objects may also be selected in the score editor by using the cursor keys, clicking an event in the event list or making use of the CUE or CATCH functions. The score editor will update its display to reflect the event's time position.

6.2 Moving objects

To move individual objects in the score editor, place the mouse pointer on top of the object (on notes, the notehead) and press the left mouse button: the pointer changes into a pointing finger. The object will be selected and will move with the mouse until you release the mouse button.



To move a group of objects, they must first be selected (see above), so that they all blink together: moving one selected object will move all the other objects simultaneously.

6.3 Copying objects

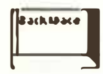
Moving objects, then pressing 'Shift' while releasing the mouse button allows you to copy the objects to a new destination. The original objects remain where they were. In Full Score mode, objects may even be copied from one track to another.

6.4 Deleting objects

Objects can be deleted by moving them in any direction to the borders of the score editor. Confirmation of the deletion will appear in the Control Line as will the number of objects deleted.

Where a group of objects are involved, it is the position of the object being moved by the mouse that dictates when the deletion takes place.

All the symbols which are "extensions" of notes (fermata, accents etc) will be simultaneously deleted.



'Backspace' also deletes the selected objects.

7. Single track and full score mode

As well as displaying one track's stave or double-stave, NOTATOR allows the display of up to 32 simultaneous independant voices in what is called "full score" mode: select "Full Score" in the "Edit" menu or press 'U'.

In full score mode, the staves of the current pattern are shown one on top of another. The order of the score's staves corresponds to the order of the track numbers. In full score mode, all the displayed staves can be simultaneously edited.

Any combination of single and double staves is allowed. The maximum single staves one pattern can give you is 16 (or up to 16 double staves or any combination thereof!).

To have more than 16 single staves in full score mode, switch on "32 tracks/Pattern" mode in the "Flags" menu:

- Your main pattern now has a "slave" pattern, which is always the next-numbered pattern (if your master is pattern 1, your slave is pattern 2).

- The full score will show behave as if all the tracks displayed belong to the main pattern: you will see no join.
- You should always access the tracks of the slave pattern from the master pattern's full score mode.

Tracks that are "hidden" (press 'H') on the main page will not be shown in the score editor, nor will they be heard via MIDI. In the "Display Parameters" window ("Edit" menu), tracks whose numbers are clicked to "grey" (ie deselected) will be heard via MIDI but not seen in the score.

When editing in full score mode, bear the following in mind:

- Although full score mode can show the staves of many tracks at the same time, the event list and Hyper Edit show the events of one track at a time. The name of this "current" track appears in the top left corner of the event editor. The current track is determined by selecting a score object in a stave, or by giving a short click in an empty part of a stave: the event list will then show that track's events.
- Any event-altering functions used during full score mode (eg "Process Data", "Transform", "Double Speed") will affect the current track: make a habit of looking out for the current track's name at the top left.
- When entering objects, the stave where the mouse pointer is becomes the current track. If the mouse is moved from stave to stave before the object is released, you will hear the different MIDI instruments reacting (if "MIDI OUT" in the "Edit" menu is on).

11. Score Display

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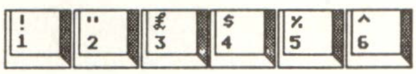
1. Entering notes

You have already read about the MIDI sequencing possibilities in the manual. In NOTATOR, notes can also be entered directly onto the stave.

1/1 to 1/64 notes, together with their dotted and triplet equivalents, can be selected manually using the mouse. The straight, triplet and dotted forms of the notes are grouped by note value in the lefthand partbox, or are all immediately visible in the pop-up partbox *(see section 9.7 "Tuplets" for information on triplets and other tuplets)*.

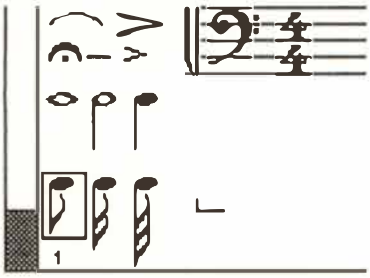
Selecting a note value determines the step/rest value in the MIDI Step Input function.



The '1' to '6' keys in the typewriter keypad provide a neat way of selecting the note values prior to Step Input or mouse-entering: press each key again to get the different straight, dotted and triplet forms.

The velocity of notes entered via MIDI Step Input or the mouse will default to that of the last velocity value selected: enter a note, change its velocity to that desired, and from now on all the velocities will be the same until you change again.

"Partbox MIDI Channel": the MIDI Channel of notes and user-rests being entered with the mouse or via Step Input can be selected by clicking the little number in the bottom lefthand corner of the screen, or press 'Shift' with one of the typewriter pad number keys (including the two to the right of '0').



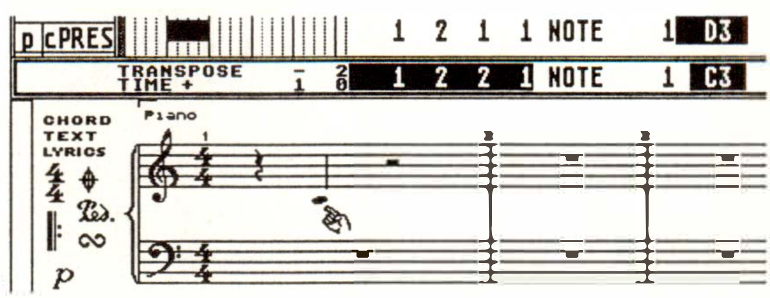
The partbox MIDI Channel is useful in Polyphonic Mode *(see section 25).*

The length of a note already on the stave is altered by changing its MIDI length in the event list *(see Chapter 9.5.7)*. The resulting display will be affected by the current display format and any "Rest Correction" or "Display Interpretation" *(see Chapter 11.9)*.

2. Transposing and moving notes in time

Moving notes around the screen will, depending on the direction of movement, transpose and/or move them in time.

During the moving, the Control Line will give the transposition and the time-movement offsets, together with the current pitch and time position of the moving note.



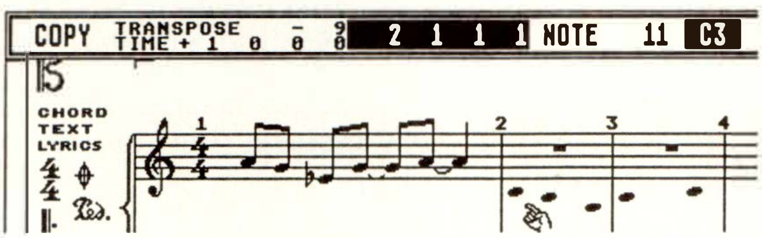
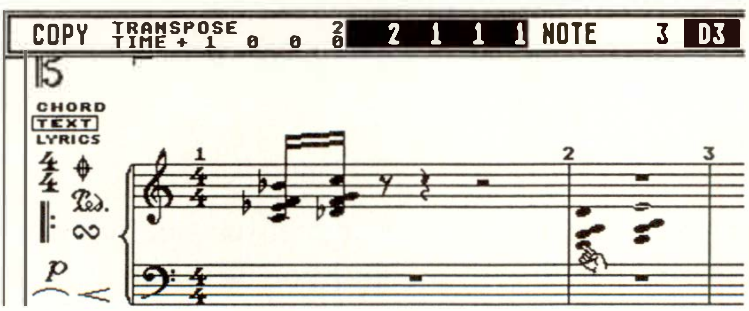
To make editing easier, movement can be restricted to a horizontal OR vertical plane by giving a right-click while holding the note or other object with the left mouse button: this selects between vertical (transposition) and horizontal (time) movement. Clicking again selects the other option. The Control Line tells you what you have selected.

Tip: if you get lost and want to start again, clicking the right mouse button twice will restore the object to its original position.

3. Copying notes

Dragging notes while keeping 'Shift' depressed allows you to copy (or duplicate) them to a new destination. The original notes remain unchanged.

In full score mode, notes may even be copied between tracks.

The Control Line will say "COPY".

While copying, you can select just one direction of movement (see above) with a right-click.

4. "MIDI microshifting": velocity and time position

You can fine-edit the MIDI time positions and velocities of selected notes by pointing the mouse pointer at the selected notes, holding 'Control' and moving the mouse pointer.

Horizontal movement of the mouse will be translated into 1/768th or 1/1536th steps (depending on the resolution); vertical movement will alter the velocity value. A left-click selects time movement, a right-click selects velocity, so you can choose whether to have one or both at the same time.

5. "Graphical microshifting" of notes

Moving a note left or right while holding 'Alternate' allows you to adjust its <u>horizontal</u> position by a small amount <u>without affecting its MIDI position.</u> An additional right-click restores the note to its starting point if you get lost.

Cancelling "Graphical microshift": a note can be restored to its original position afterwards by holding 'Alternate' and clicking it with both mouse buttons at the same time.

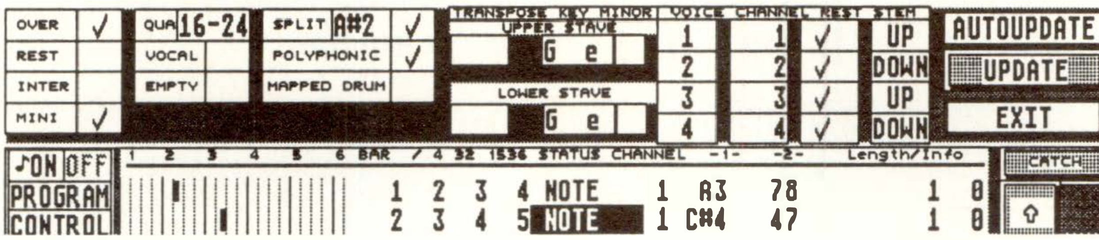
6. Parameters that affect the display

NOTATOR has a whole range of parameters which influence the display of notation without affecting the actual MIDI events themselves. Most of these work on a per-track basis, some affect the whole song.

Here is a short description of the three main windows used to enter values, with a detailed description of the parameters afterwards.

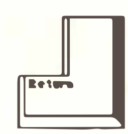
6.1 Parameter Mode window

This window is accessed via "Parameter Mode" in the "Edit" menu or by pressing 'X': it displays all the important parameters of the current track in a window that opens up over the top of event editor. The event editor and score editor remain active so that you can check the effect of the various display parameters as you work.

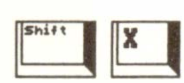


If "AUTOUPDATE" is active (black letters on a white background), the score editor will be automatically updated every time change a display parameter. When you are making lots of changes, especially if you are in Full Score mode, it can make sense to disable "AUTOUPDATE" and to click "UPDATE" every so often: an "update" is also done when you leave the window.

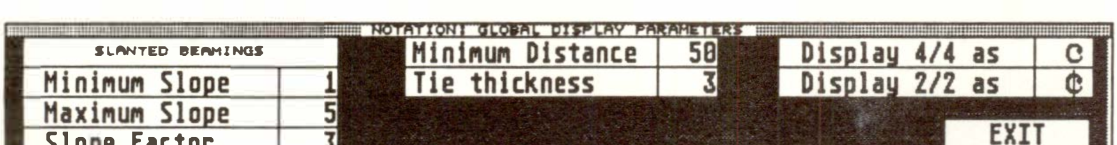
Close the window via "EXIT" or pressing 'Return'.

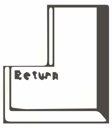


6.2 Global Score Parameters window



This window is accessed via "Global Score Parameters" in the "Edit" menu or by pressing 'Shift X': it displays global parameters that affect the whole song in a window that opens up over the top of event editor. The event editor and score editor remain active so that you can check the effect of the various display parameters as you work.

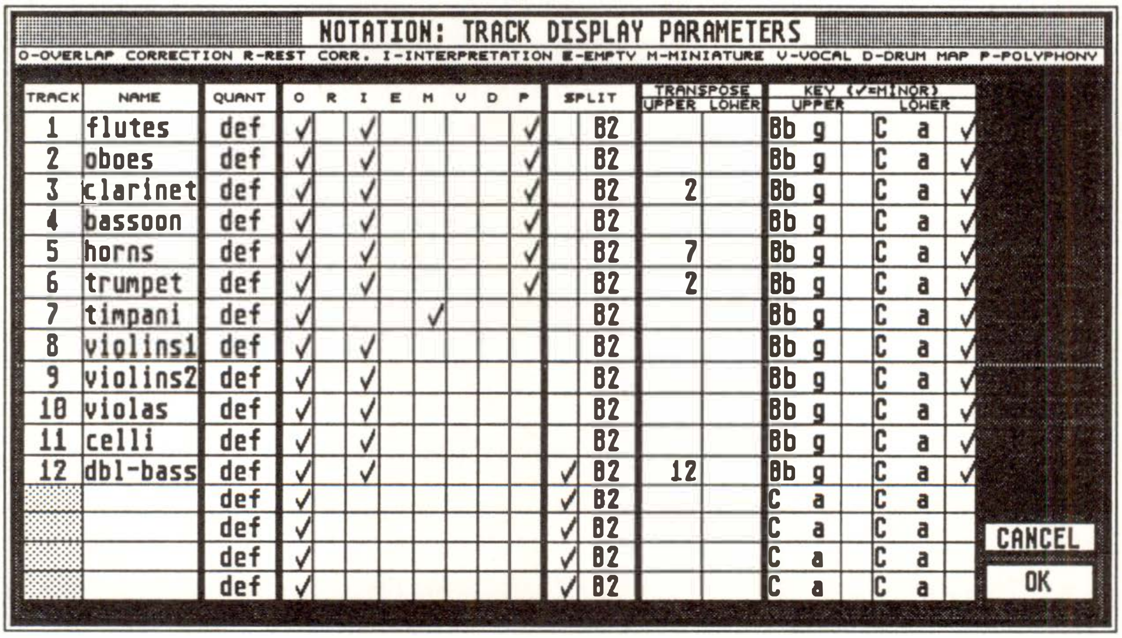




Close the window via "EXIT" or pressing 'Return'.

6.3 Display Parameters window

This large window is accessed via "Display Parameters" in the "Edit" menu: it displays a range of the most important display parameters for all 16 tracks of the current pattern. Each pattern has its own Display Parameters window.



TRACK	NAME	QUANT	O	R	I	E	M	V	D	P	SPLIT		TRANSPOSE UPPER	TRANSPOSE LOWER	KEY (✓=MINOR) UPPER		LOWER	
1	flutes	def	✓		✓					✓		B2			Bb g		C a	✓
2	oboes	def	✓		✓					✓		B2			Bb g		C a	✓
3	clarinet	def	✓		✓					✓		B2	2		Bb g		C a	✓
4	bassoon	def	✓		✓					✓		B2			Bb g		C a	✓
5	horns	def	✓		✓					✓		B2	7		Bb g		C a	✓
6	trumpet	def	✓		✓					✓		B2	2		Bb g		C a	✓
7	timpani	def	✓				✓					B2			Bb g		C a	✓
8	violins1	def	✓		✓							B2			Bb g		C a	✓
9	violins2	def	✓		✓							B2			Bb g		C a	✓
10	violas	def	✓		✓							B2			Bb g		C a	✓
11	celli	def	✓		✓							B2			Bb g		C a	✓
12	dbl-bass	def	✓		✓						✓	B2	12		Bb g		C a	✓
		def	✓								✓	B2			C a		C a	
		def	✓								✓	B2			C a		C a	
		def	✓								✓	B2			C a		C a	
		def	✓								✓	B2			C a		C a	

Close the window via "OK" or pressing 'Return'. "Cancel" cancels any changes you may have made while the window was open.

This window is intended to give an overview over a whole pattern. Click a track's number to grey to remove that track from the score editor display (MIDI output remains unaffected). A name entered here will appear on the main page too. Entering a name in an empty track "initializes" it.

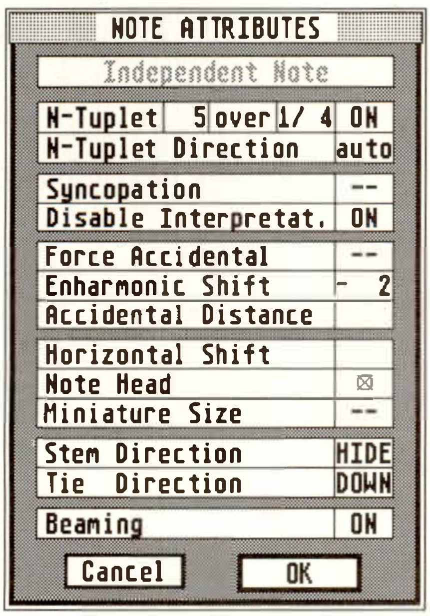
How to set display defaults: parameters entered in the lowest empty track (usually track 16) will autocopy to the other empty tracks in the pattern if you leave the window via “OK”. These defaults are saved as part of a Song (eg “AUTOLOAD.SON”). *See Chapter 28: “DISK OPERATIONS”, section 2.3.*

6.4 Note Attributes window

The Note Attributes window allows the setting of many functions which can apply to individual notes.

Most of these functions may be carried out via key commands and are described in this Chapter. The Note Attributes window brings together the various functions, making it possible to see at-a-glance what is active.

NB: Functions which can only be accessed via the Note Attributes window will be pointed out.



The Note Attributes window is opened by double-clicking the note which requires editing.

These are the functions:

INDEPENDENT NOTE: when active, creates an audible MIDI note that can be used for many different purposes (available via the Note Attributes window only). *See Chapter 12: "SCORE SYMBOLS", section 16.*

NB: when INDEPENDENT NOTE is clicked, certain of the Note Attribute panels change their meaning. The following options assume that you have left INDEPENDENT NOTE inactive at present.

N-TUPLETS: in this line, set the number of subdivisions (2-15) and the length of the denominator (1/1 to 1/16). This option is activated by clicking the "- " box to "ON" (and is available via the Note Attributes window only) *(see also section 9.7 "Tuplets").*

N-TUPLET DIRECTION: this positions the tuplet bracket and value (available via the Note Attributes window only).

AUTO: NOTATOR decides where the bracket should be placed.

UP/DOWN: you may override the automatic choice.

HIDE: the bracket and value are not shown.

SYNCOPATION: syncopation display on/off *(see section 9.6).*

DISABLE INTERPRETATION: allows Interpretation Mode or Rest Correction Mode (whichever is active) to be disabled for individual notes (available via the Note Attributes window only).

This function means the display of notes is made yet more flexible, particularly where you have made use of the very-necessary Interpretation or Rest Correction Modes after realtime recording: these powerful display-enhancing modes can be disabled for individual notes where you would not otherwise be able to get the exact display you required.

FORCE ACCIDENTAL: also called "confirmation accidentals", this forces a note to display its accidental *(see section 16.4)*.

ENHARMONIC SHIFT: shifts the note's enharmony in five steps *(see section 16.3)*.

ACCIDENTAL DISTANCE: determines the distance (0-3) between the note and its accidental (available via the Note Attributes window only).

HORIZONTAL SHIFT: gives direct control over the "graphical microshifting" of a note (-16 to 15) *(see section 5)*.

NOTE HEAD: selects the note's head symbol *(see section 14)*.

MINIATURE SIZE: decides whether that note should be in miniature (available via the Note Attributes window only).

STEM DIRECTION: can be determined by NOTATOR, or forced up or down, or can be hidden *(see section 13)*.

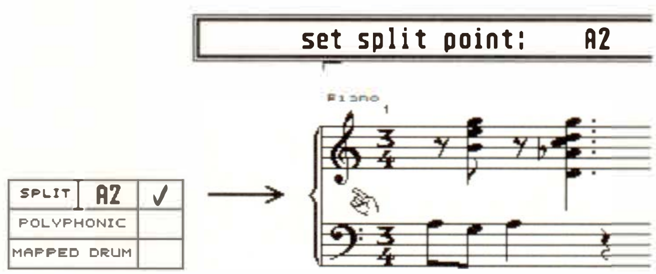
TIE DIRECTION: the tie to the next note may determined by NOTATOR, or forced up or down (available via the Note Attributes window only).

BEAMING: determines the beaming to the next note *(see section 12).*

See also section 27 "Process Note Attributes".

7. Double stave (piano stave)

Each track in a pattern can be displayed as a single or a double stave by pressing 'S'. The notes' pitches determine whether they are shown as belonging to the lefthand or righthand stave. The pitch at which the change occurs is called the "split point", which defaults to C3, the top note of the lower stave. The split point is changed by left-clicking and holding the area just below the upper stave's clef and sliding the mouse backwards or forwards, watching the Control Line display. Clicking the right mouse button while holding the left cancels the change and reverts the split point back to C3.

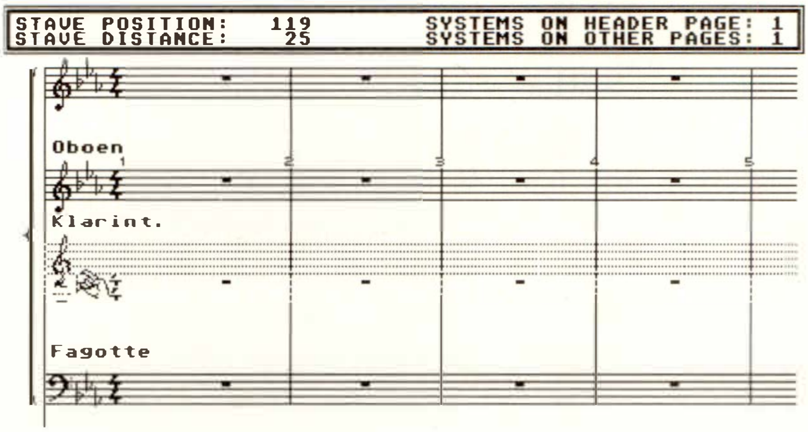


As this fixed split point cannot deal with overlapping left and right hands, you need to use the "flexible split point" feature of the Polyphonic mode *(see this Chapter section 25.5.3).*

The split mode and split point are settable in both the Parameter mode and Display Parameters windows.

8. Distance between staves

In Full Score mode, the distance between staves is freely alterable by clicking and holding a stave by its clef symbol, then dragging it up or down.



Dragging the stave with the left mouse button will cause all the staves below it to move as well, so that you only change the distance between the dragged stave and the one above it. Dragging the stave with the right mouse button will move that stave only, independently of the others.

The Control Line will display, on the left, the position of the stave in the score, as well as its distance from the stave above. The values are screen pixels.

The Control Line also shows how many staves or systems you will be printing on the first/subsequent sides *(see Chapter 14: "SCORE PRINTOUT").*

To alter the distance between *printed systems, or between each printed line of a single track*, you need to alter the "lower printing limit", and/or the distance between the stave and the score editor top borderline *(see Chapter 14, section 2).*

9. Quantizing the display

9.1 Basic considerations

It is inevitable that any process that involves converting music, played in realtime, into score, must bring with it a certain "rounding off" of details. Notation cannot cope with the detail that the sequencer can, most notably as regards time position and note length. This is what is called "display quantization".

When Beethoven wrote his music, the act of putting pen to paper involved his writing a stylized version of what he had just played on the piano; just because he wrote a quarter note as being at the beginning of a bar, does not mean that when he played it, he played precisely in time and held onto the note for exactly that value. It is the same for your music, the difference being that you can see, in the event list, to the nearest 1/768th note how late you were or how long your quarter note actually was.

To produce a readable (therefore playable) output from what you have played in in realtime, NOTATOR has a range of display parameters which correct the display of notes' time positions and lengths. These parameters affect the display *without affecting MIDI data*. These parameters idealize or "quantize" the time position and note length, so that the result you see is as close as possible to what you intended.

The basic consideration you must accept at all times is that you must attempt to play in time with the metronome: if you do not, NOTATOR cannot guess what your intentions are and will assume you intend to display the weird notation that comes of not playing in time.

You do not have to MIDI quantize the music to get it perfectly in time, but you must at least try to get it right.

9.2 Display “format”

Each track can have its own different display quantization or “format”: being display-based, this has *no effect on the MIDI data*. Choose the value in the Parameter mode window in the “QUA” box. This value gives:

- **the smallest value of note length the display will allow;**
- **the closest that notes can be to each other.**

You may select from straight, triplet or combined quantization. When a combined (eg 8–12) display quantize value is selected, NOTATOR is capable of interpreting notes depending on how accurate your own realtime playing was; it will correctly distinguish between swung “dotted eighth + straight eighths” and full-blown triplets, again providing your own playing was accurate to the metronome.

The following display quantization is available:

Straight	triplet	combined
4	6	4–6
8	12	8–12
16	24	16–24
32	48	32–48
64	96	64–96

If the value reads “Def” (default), then the display quantization adopted is that of NOTATOR’s main display “FORMAT”, seen in the Information Bar above the event list (in this FORMAT box, the straight value includes the combined one, so “1/16” means “16-24”).

You cannot have more than one display quantize per track.

Notes whose timing or duration are shorter than the display quantize selected for that track will be shown as having the same value as the display quantize.

The display quantize is no longer relevant if you are "MIDI step inputting" or entering via mouse: in this case, you may find it useful to select a higher value so you can enter any value of note you choose.

9.3 Overlap Correction mode

Switchable in the Parameter Mode window in the "OVER" box, the Overlap Correction mode prevents the (mostly-undesirable) display of notes that overlap each other slightly due to lazy or legato playing.

It is normally left on all the time, though this mode is built into the Interpretation mode as well.

9.4 Rest Correction mode

Switchable in the Parameter Mode window in the "REST" box or by pressing 'R', the Rest Correction mode suppresses tiny rests between notes (which are there due to your human playing) by lengthening the display of the previous notes; intentional rests are still displayed.

Switch Rest Correction mode off when entering music with the mouse or via MIDI Step Input.

9.5 Interpretation Mode

Switchable in the Parameter Mode window in the "INTER" box or by pressing the 'I' key, the Interpretation mode has a special effect on the display of note lengths: basically, it strives to present you with the best readable display of your music.

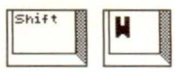
As with the other display parameters, this mode has no effect on the MIDI time position of the Notes, nor on the MIDI note length.

Switch Interpretation mode off when entering music with the mouse or via MIDI Step Input.

Tip: in general, the best results are obtained by switching Rest Correction mode off, and Interpretation mode on. This all depends on your music, and it is quite usual to have some tracks with one, and some with the other mode, within a Full Score. You should experiment for each played track to find which you prefer.

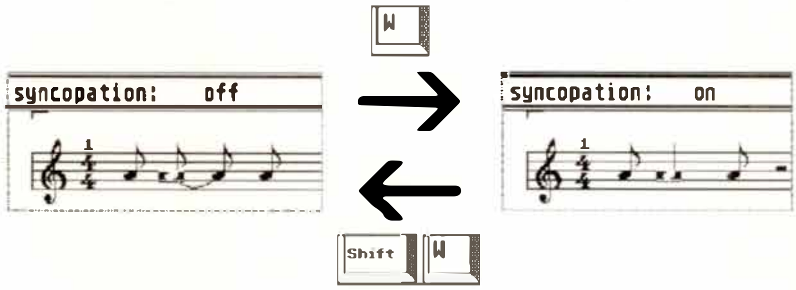
9.6 Syncopation display

Syncopation is automatically shown by the display of tied notes across the beat, allowing the beat to be seen. You may convert these into a syncopated display.



'W' syncopates the selected notes, and 'Shift-W' restores the original display.

Example: suppose you wish to show the second note of the phrase "eighth note, quarter note, eighth note" as being syncopated. By default, the second note is displayed as two tied eighth notes: select it and press 'W', and the tied notes become a quarter note.



9.7 Tuplets

A "Tuplet" is any group of notes which is not in normal duple time. NOTATOR can display groups of up to 15 notes.

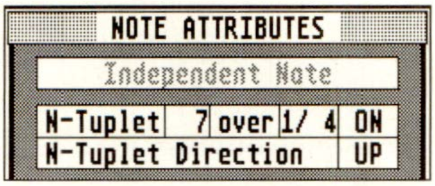
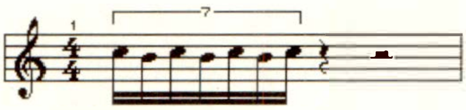
NOTATOR will recognize and automatically display triplets that you have recorded in a track, provided they were reasonably-accurately played. Over and above this, triplets and many other less common groupings may be mouse-entered onto the stave. Quintuplets etc are not automatically recognized: if your recording contains accurate groups or 5,7 etc, the program must be instructed to display them. It can do this, no matter what the display format value is.

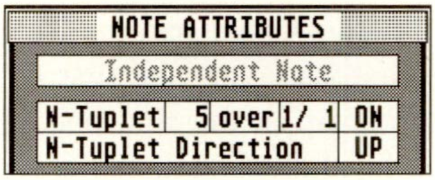
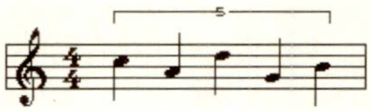
To define a tuplet in a group of notes that already exist on the stave, select the first note of the group and then double-click it.

The "Note Attribute" window then appears, in which you may set various attributes for that note.

In the "N-Tuplets" line, switch the mode on, and set the number of subdivisions and the length of the denominator. Up to 15 subdivisions are allowed.

Example 1:





To enter tuplets from the partboxes with the mouse, enter the first note (preferably a short one), then double click it to make the "Note Attributes" window appear; enter the number of subdivisions, switch the "N-Tuplet" line on, and click "OK". You will see a display of rests where the notes are to be entered (if you see tied notes, it means your first note is too long for the subdivisions you have selected – simply shorten it in the event list). Now enter the new notes, placing them on top of the rests (use "SNAP" mode if required).

Example 2: two ways to enter triplets by hand:

To enter a triplet using the Note Attributes window, enter a note from either partbox, double click it, enter "3" in the "N-Tuplets" box and the appropriate time in the "over" box (1/1 for triplet minims to 1/16 for triplet 1/32nds). Switch the line on and click "OK".

To enter a triplet directly from either partbox, select the desired triplet value first, and enter the first note. Drag in the second note on top of the first one, and without releasing the button, slide the note to the right until the Control Line displays the next timing step: release the button. Repeat for the third note, dragging it in over the second note. Done.

The style of the tuplet number is definable in the "TUPLETS STYLE" and "TUPLETS ITALIC" boxes of the "Fonts" window in the "Edit" menu *(see Chapter 13.6)*

10. Rests

10.1 Automatic rest display

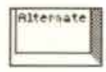
Rests are automatically entered by NOTATOR according to notes' time positions and lengths. In Polyphonic mode, the rests of each voice are automatically displayed. The Parameter mode window allows this automatic display to be switched off altogether in the "REST" boxes, which is very useful in Polyphonic mode, although the facility remains active even when Polyphonic mode is off *(see section 25 below)*.

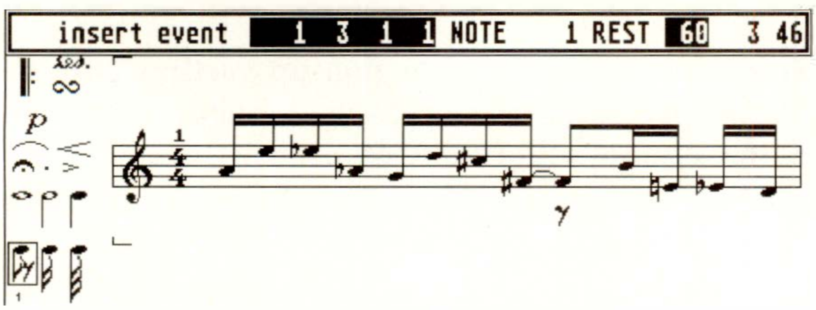
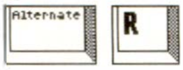
10.2 User rests

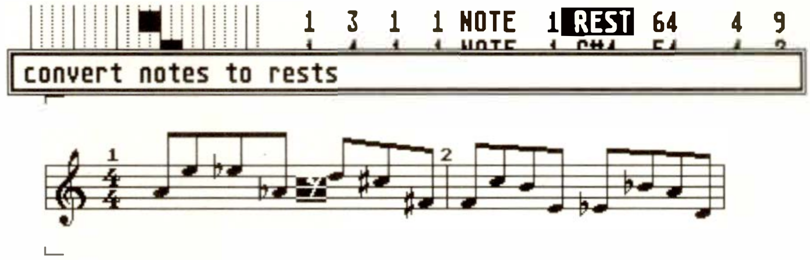
In certain special situations, you need to be able to override the automatic rest display. This is done with special "rest events" which behave like Note events. They have, like Notes, a MIDI Channel which is used in Polyphonic mode.

These user rests differ from the automatic rests as follows:

- They remain visible even when the display of automatic rests is switched off.
- They can be moved vertically (important in Polyphonic mode).
- They are altered by the display quantization like notes *(see section 9)*.
- They can be "graphically microshifted" like notes *(see section 5)*.



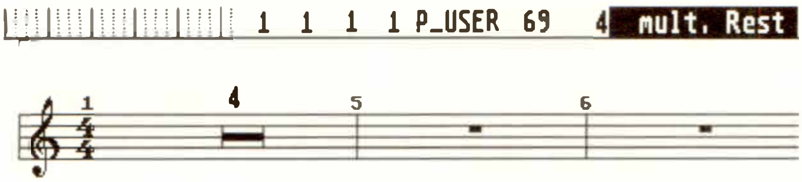
To enter a user rest, choose its value by selecting the appropriate note value in the lefthand partbox, then press 'Alternate' while entering the "note" with the mouse in the usual way.



Alternatively, 'Alternate-R' can be used to change selected notes into user rests of the corresponding value.

Tip: user rests can be used for more than you think. It is beyond the scope of this manual to give all the possibilities, but basically, if you wish to have a display of notes that NOTATOR appears not to want to give due to its automatic routines, try entering one or more user rests into the score at that point: the rests will not be seen, but their effect on the score will be.

10.3 "Rests of more than one bar" symbol

When displaying a single track in the score editor (ie not in Full Score mode), strings of empty bars can be grouped together under one bar using the normal symbol.

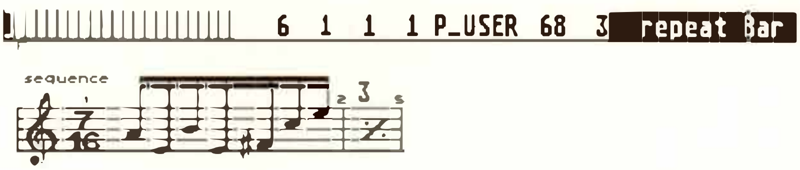
Enter the symbol from the pop-up partbox into the first empty bar, then select the number of rest bars in the symbol's P_USER 69 event's "second data byte" in the event list "-2" column. Full Score mode will disable this function.

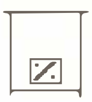
You will see how the event actually removes the following rest bars from the display as you scroll the number.

The font of the number that states the number of bars is set in the Fonts window's "MULT. REST STYLE" box *(Chapter 13, section 6).*

11. "Repeat previous bar(s)" symbols

This symbol is used to indicate to the performer that you wish him/her to repeat the previous bar.

These symbols (which appear as P_USER 68 in the event list) may be entered from the pop-up partbox onto the stave. The events' "second data byte" determines the number of repeats, which appear as a number above the symbols. This will affect the display by changing the stave's bar numbers accordingly. The "repeat previous two bars" symbol displays two slashes instead of the number above the symbol.





The symbol suppresses the display of notes in a bar, though it is your job to ensure the notes do in fact repeat the previous bar: the notes will still be heard, but the bar displays the symbol instead.

Tip: normally, the symbol will disappear from the display when you switch Full Score mode on. If you place a "1" in the event's "second data byte", the symbol will remain in Full Score mode.

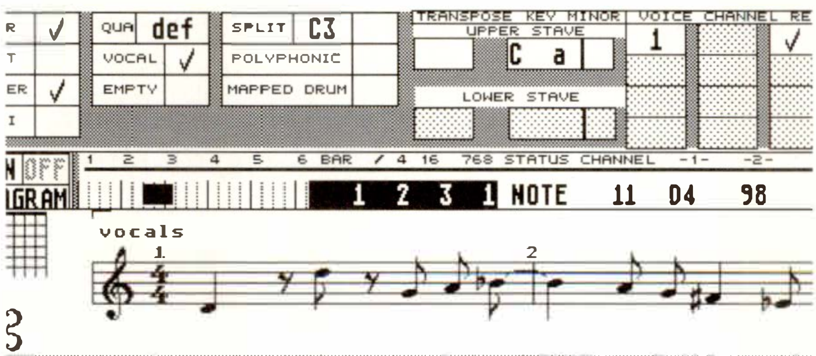
12. Beaming

12.1 Automatic beaming

Eighth notes and shorter are automatically beamed in groups of beats.

12.2 Vocal mode

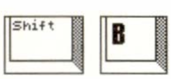
The automatic beams can be removed (eg when you add lyrics) from a whole track by pressing 'V' or clicking the "VOCAL" box in the Parameter mode window.



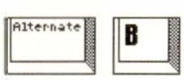
12.3 Beaming and unbeaming

You may individually override or add to the automatic beams, even in Vocal mode.

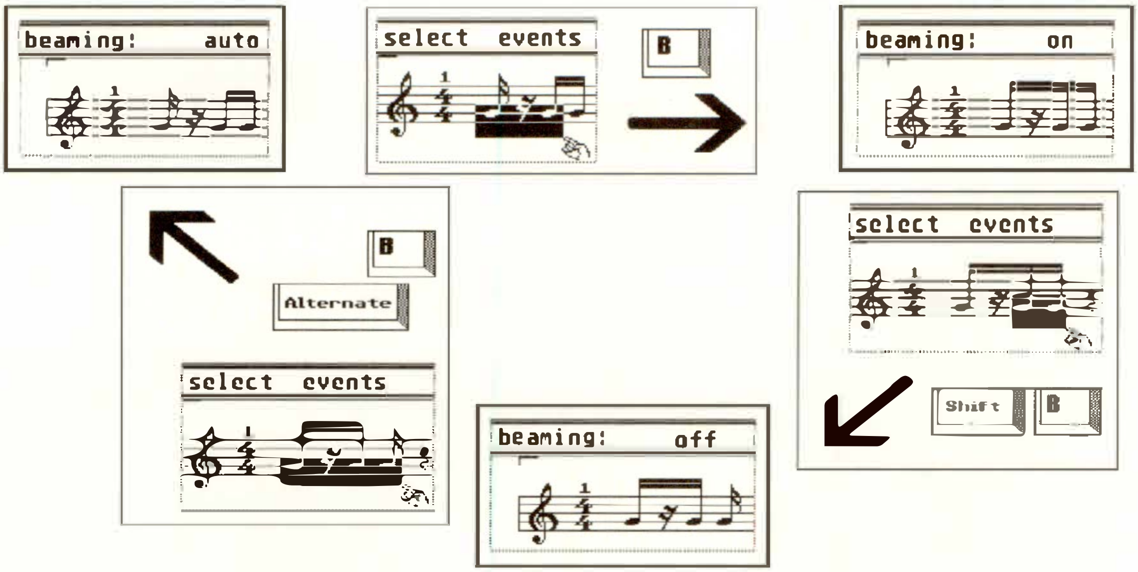
- **To beam a group of notes together, select them first and press 'B'.**



- **To erase beams, first select the relevant notes then press 'Shift-B'.**



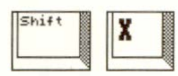
- **To reset the beam display according to the program's automatic setting for the selected notes, press 'Alternate-B'.**



The Note Attributes window also allows the stem parameters to be edited: double-click the selected note.

12.4 Sloping beams

NOTATOR displays sloping beams automatically. The height and angle of the beams depend on the pitch differences between the notes being beamed.

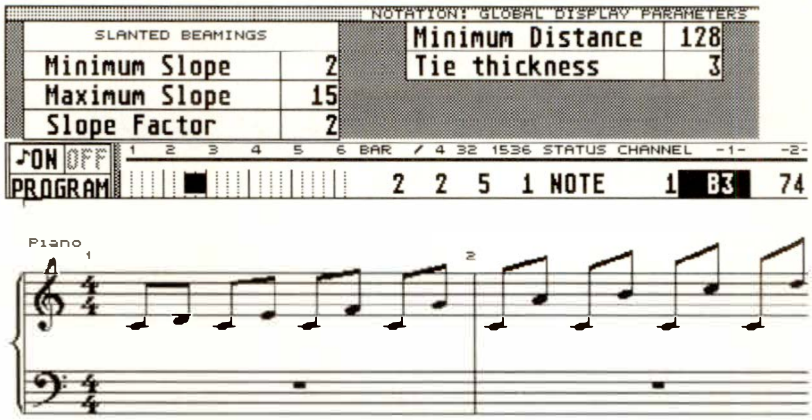


The Global Score Parameters window in the "Edit" menu (or press 'Shift-X') is where you edit the display of the sloping beams: changes affect the whole of the song globally:

MINIMUM SLOPE: the smallest pitch difference at which a beam starts to slope.

MAXIMUM SLOPE: the maximum slope allowed. If 0 is inserted here, the beams will be horizontal.

SLOPE FACTOR: determines the relationship between slope and pitch interval.



Depending on your printer's printout resolution, the sloping beams will tend to appear as a succession of small steps. Lower (9 pin) resolution printers may spoil the overall result, especially where small pitch intervals are concerned. There are two ways of preventing the display of too-shallow slopes:

- increasing the MINIMUM SLOPE value, where small pitch differences are given a horizontal beam;
- increasing the SLOPE FACTOR value, where even small differences in pitch will show a steeper slope. At the same time, you must lower the MAXIMUM SLOPE value to limit the effect on large intervals.

The resolution of most printers is appreciably better than the resolution of the screen: it is up to you to find the display you feel most at home with by running test printouts.

The "Force Horizontal Beams" switch in the "Set Drum Map" window ("Options" menu) forces all the beams for the drum track to be horizontal.

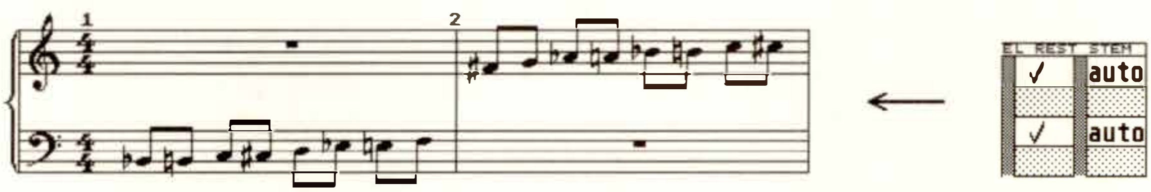
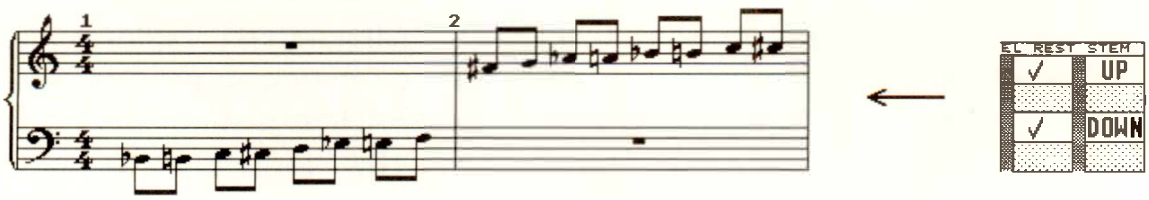
13. Note stems

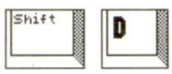
The direction of stems is usually automatically decided by NOTATOR. This can be overridden on a per-note or per-Polyphonic Voice basis.

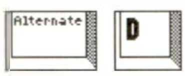
For special applications, stems can be printed out without noteheads *(see section 14 below)* and noteheads can displayed (and printed) without stems.

13.1 Stem parameters per stave

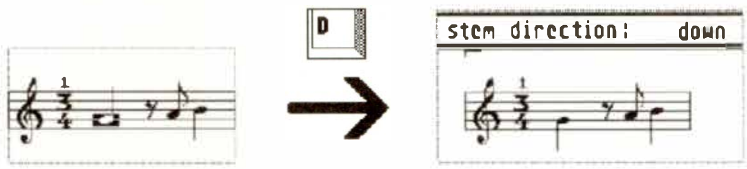
The "STEM" box in the Parameter mode window allows the following stem parameters to override the automatic display:

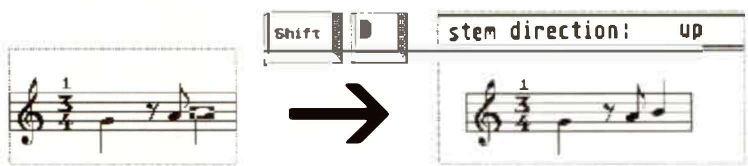
AUTO: stem direction is determined by a note's pitch
UP: all stems go up
DOWN: all stems go down
HIDE: no stems will be displayed.

13.2 Stem parameters per note





The direction of individual stems or groups of stems can be altered by selecting the desired notes and pressing 'D' for "down" or 'Shift-D' for "up". 'Alternate-D' restores the automatic stem direction to the selected note(s).

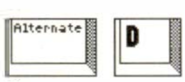




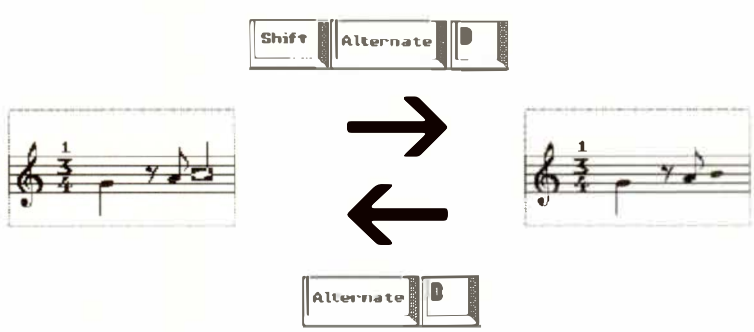
Notes connected by a beam will be handled collectively.

The Note Attribute window (double-click the selected note) and "Process Note Attributes" in the "Function" menu also allow stem parameters to be edited.

13.3 Hiding stems

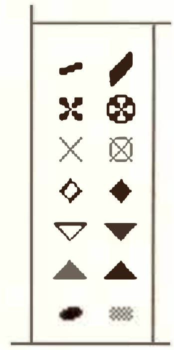


The stems of selected notes can be hidden by pressing 'Shift-Alternate-D'. 'Alternate-D' restores the display to what it was. You may also use the Note Attribute Window (double-click a note) or "Process Note Attributes" in the "Function" menu to hide stems.



14. Note heads

14.1 Altering note heads



To change the style of a note head on the screen, select the desired note head from the pop-up partbox and place the symbol on top of an existing note head in the score. You may continue entering the same selected symbol just by clicking the right mouse button without going back to the partbox, until you select a fresh object.

To give a group of notes the same note head, select them so that they flash, then drag the new note head onto one of them.

To return the note heads to their original form, either select the note(s) and press 'Shift-Alternate-E', or drag the "quarter note" note head back onto them.

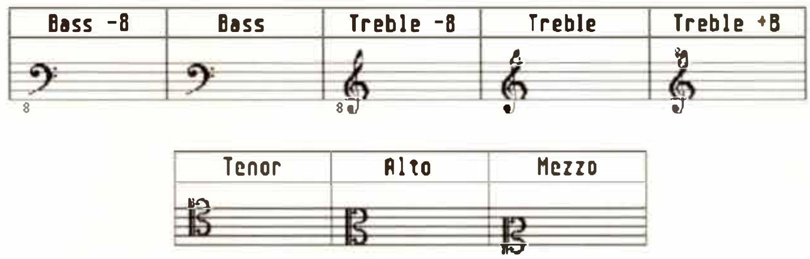
The above method is for the altering of *individual* notes. If you wish to change *all* the notes of a certain pitch to a certain note head, you should make use of the Drum Note Mapping feature *(see section 26 below)* or "Process Note Attributes" in the "Function" menu *(see section 27 below)*.

14.2 Not printing note heads

To printout stems without note heads, give notes on the screen the grey, speckled note head. This special symbol only appears on the screen, and is not printed out.

15. Clefs

There are eight clefs available:



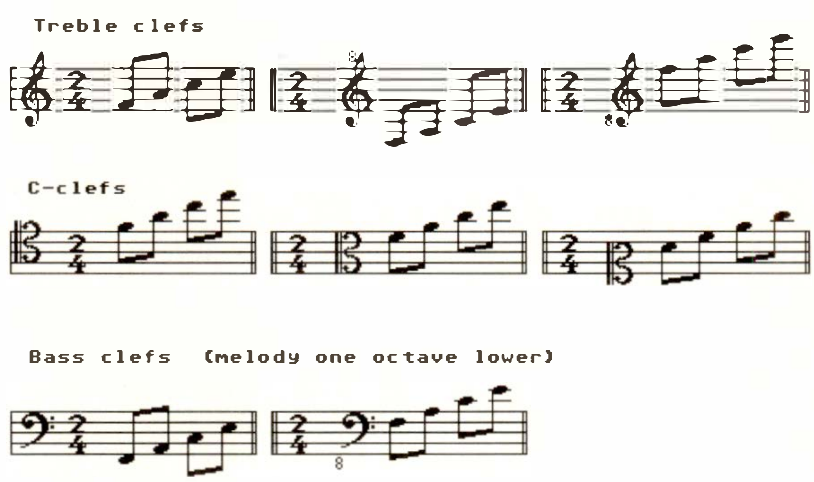
An "8" above/below the clef indicates that the notes must be played an octave higher/lower than displayed.

The clefs affect the displayed notes, but the MIDI data is not affected. Entering a clef change immediately changes the display of subsequent notes.

15.1 The basic clef

Each stave can have a different clef; each stave of a double stave can have a different clef.

A short left-click or right-click on the clef selects the stave's "basic clef".



The basic clef may be clicked at the lefthand end of the stave, whatever bar you are at: you do not have to return to bar 1 to change it.

Tip: do not use the partbox clefs for the "basic clef".

NB: A percussion clef may be selected instead of the clefs described above. *See section 26, "Percussion notation" in this Chapter.*

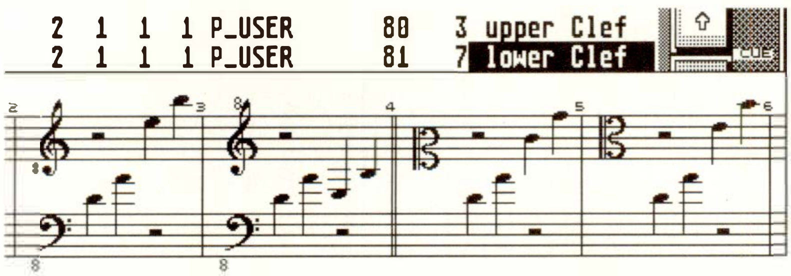
The printing of clefs can be limited or completely stopped: *see Chapter 14: "SCORE PRINTOUT", section 4.*

15.2 Clef changes within the stave

To change the stave's "basic clef", use the clicking method described in section 15.1 above.

To introduce a different clef within a stave, enter the required one from either partbox and place it at the desired position. All the notes from this place on will be displayed correctly according to the new clef.

Clefs may be positioned anywhere where there are notes, in any bar, even within beams. Once on the stave, they can be clicked to change them.



Clefs may be deleted, like any object, by dragging them beyond the score editor or pressing 'Backspace' after selecting them.

16. Key signature

There is a range of standard key signatures available. If a note does not belong to the current key signature, it receives the correct accidental. Any note's automatic harmonic display can be overridden.

16.1 The basic key signature

Each stave can have a different key signature; each stave of a double stave can have a different key signature.

A short left-click or right-click in the area between the clef and the time signature selects the stave's "basic key signature".

Each left or right-click changes the key signature sharp/flatwards following the "circle of fifths", starting at the default C major.

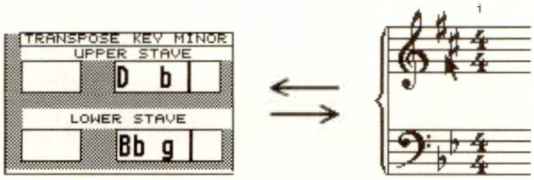
Holding 'Alternate' while clicking selects the minor scales (watch the Control Line).

The enharmonic notation of that track will change correspondingly. NOTATOR will automatically display double sharps/flats where appropriate.

The basic key signature may be clicked at the lefthand end of the stave, whatever bar you are at: you do not have to return to bar 1 to change it.

Holding 'Shift' while clicking will apply the change of key signature to all other staves (ie a double stave or Full Score mode).

The key signature may be set in the Parameter mode and Display Parameters windows in the "KEY" box: tick the "MINOR" box to get the relative minor (always the 6th degree of the major scale).



Tip: do not use the partbox key signatures for the "basic key signature".

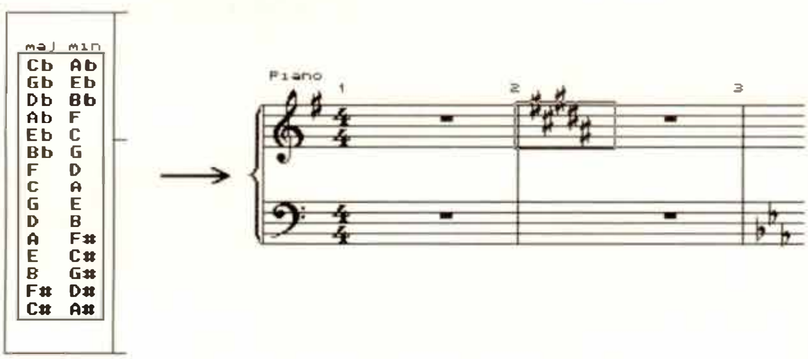
To change the stave's "basic key signature", use the clicking method described in section 16.1 above.

16.2 Key signature changes within the stave

To introduce a different key signature within a stave, enter the required one from the pop-up partbox and place it at the desired position. Accidentals from this place on will be displayed correctly according to the new signature.

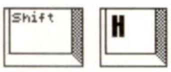
Key signatures may be positioned anywhere where there are notes, in any bar, even within beams. Once on the stave, they can be clicked to change them.

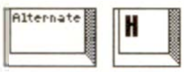
Key signatures may be deleted, like any object, by dragging them beyond the score editor or pressing 'Backspace' after selecting them.



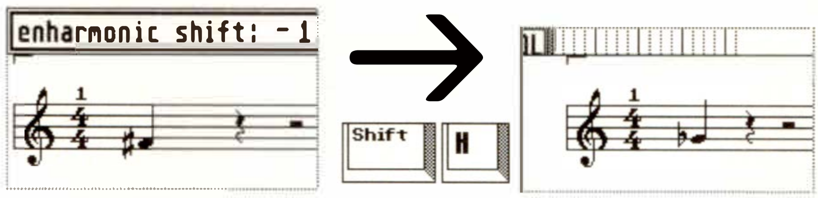
16.3 Enharmonic Shifting

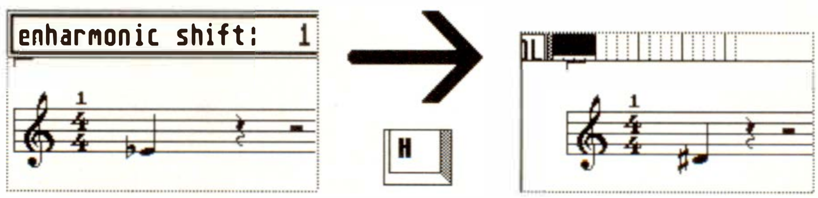
If a note does not belong to the current scale, its enharmonization is calculated automatically according to harmonic criteria. You may override the automatic choice:

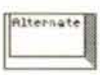




To alter the harmonic display of selected notes by up to two steps, press 'H' (down) or 'Shift-H' (up). 'Alternate-H' will restore the original enharmonization.



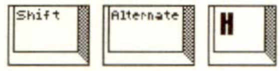




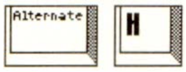
Tip: if you find yourself having to alter the enharmonization of a lot of notes, it often helps to switch to the parallel scale (hold 'Alternate' while clicking the key signature).

"Process Note Attributes" in the "Functions" menu allows enharmonic shifts to be applied to individual notes throughout the whole track. *See section 27 in this Chapter.*

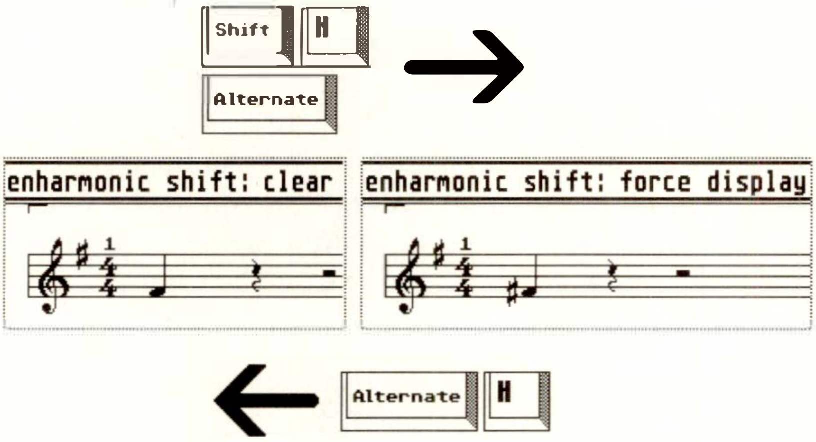
16.4 Confirmation accidentals



There are situations where you need to re-affirm the accidentals for certain notes.



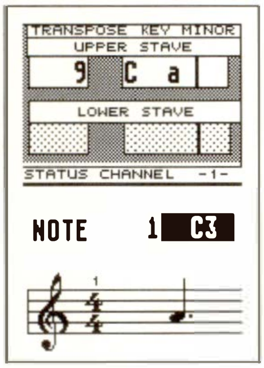
'Shift-Alternate-H' on selected notes will give each note its accidental. 'Alternate-H' restores the display to original.



"Process Note Attributes" in the "Function" menu allows confirmation accidentals to be applied to individual notes throughout the whole track. *See section 27 in this Chapter.*

17. Display transposition

You can transpose the *display* of one or more staves *without affecting the MIDI data*, in the "TRANSPOSE" boxes of the Parameter mode or Display Parameters windows.



This allows you to compose "from the keyboard" by selecting the correct keys for transposing instruments, without having to transpose your own playing. Each stave in a double stave can be transposed separately.

Example: to score music in F major for an alto sax, transpose the display by a sixth (+9 semitones up), then change the key signature from F major (one flat) to D major (two sharps). What you play/hear would remain unchanged, since the MIDI data is unaffected by the display transposition.

Contrast this with the "TRANSPOSE" track parameter on the main page which changes the MIDI data, but has no effect on the score (because these track parameters are "playback" parameters that affect the playback only *(see Chapter 6: "TRACKS")*.

18. Time signature

18.1 General

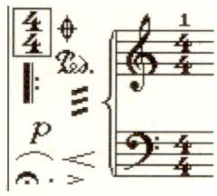
The time signature applies globally to the program: it "belongs" to a specific bar, *not* to a track, stave or pattern.

Please read the section on the time signature in Chapter 5: "POSITIONING", section 1.3.

A certain time signature in one bar applies to the same bar in all the tracks. When using several patterns in a song, you should only use time signatures with the arrange mode switched on and "Global Positions" enabled in the "Edit" menu.

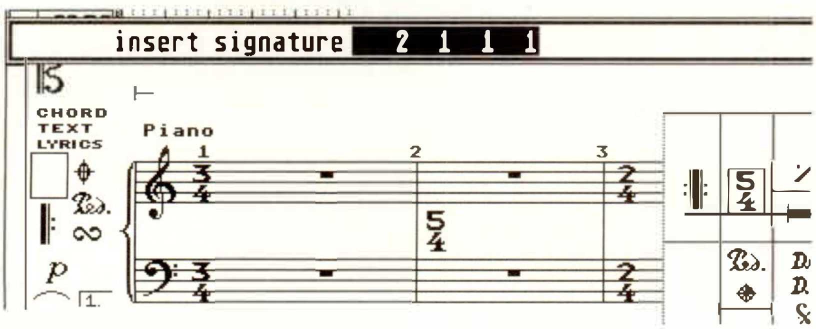
Any change in the time signature of a bar or bars will apply to the whole CREATOR/NOTATOR system. Any changes will be reflected in the relevant event list values, Main Bar Counter and of course the main time signature display (next to the elapsed-time display in the "Information Bar").

18.2 The basic time signature

In the score editor, the "basic time signature's" nominator or denominator values can be altered at any time by a short click.

Ensure that this is done only when the stave is back at its start (press 'Clr Home', or reset the Main Bar Counter to "1 1 1 1" and click "CATCH).

Please read Chapter 5, section 1.3.

18.3 Time signature changes within the score

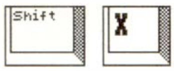
To introduce a time signature change in the score, select the desired meter in the lefthand partbox and drag the time symbol to the desired bar. The program will automatically position the time signature to the nearest bar beginning.

Both nominator and denominator can be altered at any time once the time signature has been introduced by a short click on the desired value. The signature itself can be moved to a different bar by dragging and can be deleted by dragging it to the edge of the score display.

18.3.1 Hidden time signature changes

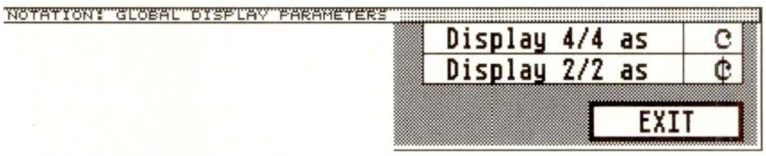
The printing of time signatures can be suppressed by clicking them while pressing 'Alternate': they become visually "crossed out". Alternatively, enter the time signature while keeping 'Alternate' pressed.

This is of help in certain situations, such as where you are working with early music, or where you wish to be able to insert as many notes as possible into a bar.

18.4 Alternative 2/2 and 4/4 symbols



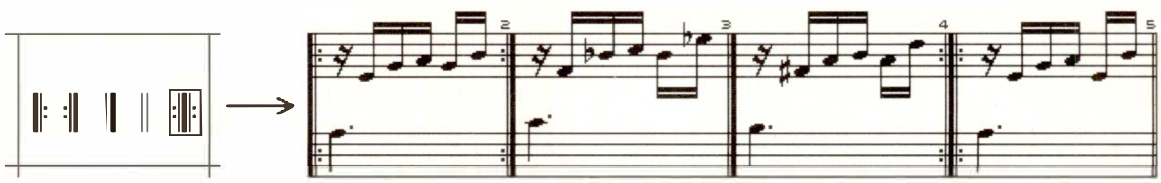
The display of the 4/4 and 2/2 time signatures can be changed to their alternative symbols in the Global Score Parameters window ("Edit" menu or 'Shift-X'). No other time signatures are affected.



19. Global repeat signs; double bars

Different types of signs and double bars can be selected in the pop-up partbox and entered via the mouse. Like the time signature, they are global and belong to a specific bar, *not* to a track or pattern. They should therefore be used with "Global Positions" switched on ("Edit" menu).

Once on the stave, signs can be dragged around or deleted via the mouse.

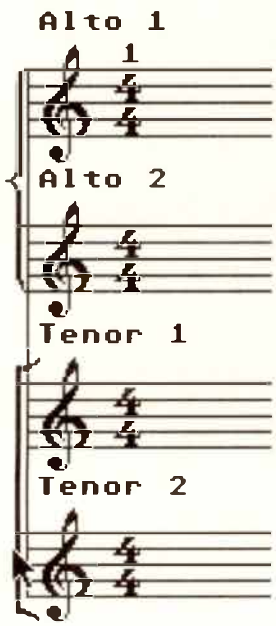
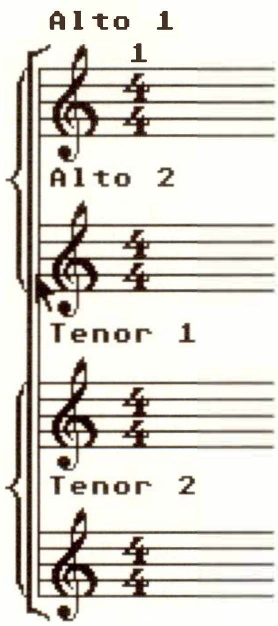
These signs are intended for transcription only, and have no effect on the actual running of the sequencer.

20. Making a system in Full Score mode

20.1 Bracketting staves

In Full Score mode, you can group together a number of individual staves using round or square-shouldered brackets, and linking the bar lines.

In Full Score mode, if you click in the area just to the left of a stave, you will bracket that stave to the one above it. Click again, and the bracket is deleted.

A left-click enters/deletes round-shouldered brackets, a right-click, square-shouldered brackets.

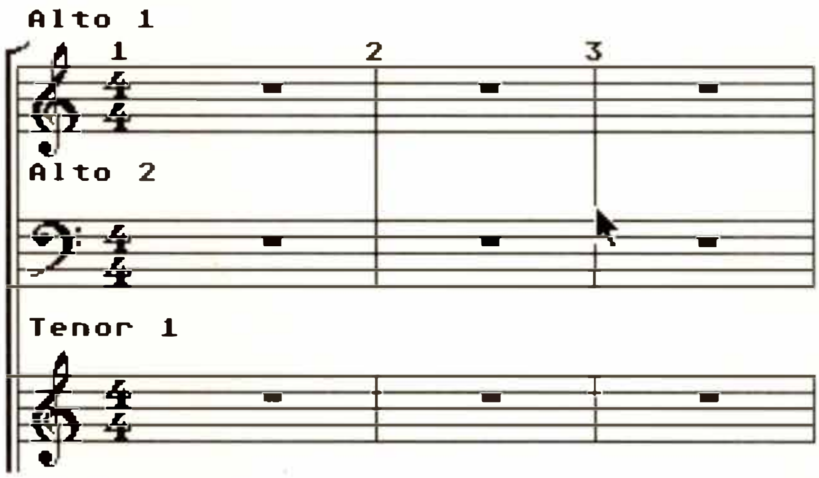
Holding 'Shift' at the same time puts a bracket around all the staves in the Full Score mode.

To bracket, say, three staves, click the lowest stave to bracket it to its neighbour, then click the next stave up to bracket it to *its* neighbour.

You can combine brackets.

20.2 Linking bar lines

In Full Score mode, if you click the top of a stave's bar lines, you will link that stave to the one above it. Click again, and the extended lines are deleted.

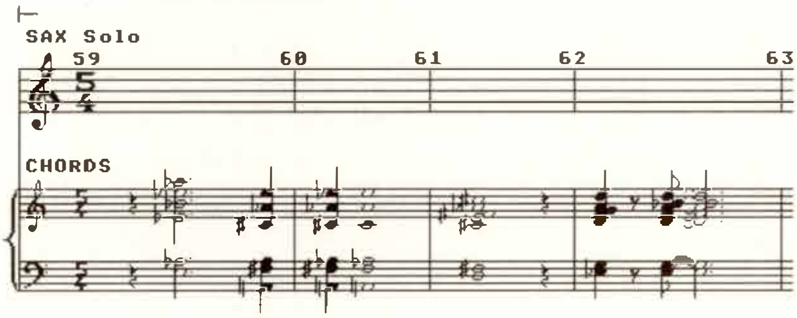
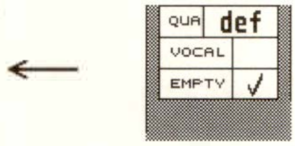
Holding 'Shift' at the same time links all the bar lines of the staves in the Full Score mode.



Note: the brackets and linked bar lines of a double stave are not deletable.

21. “Empty stave” mode

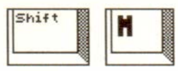
The “EMPTY” box in the Parameter mode or Display Parameters windows has the effect of displaying a completely empty stave instead of the standard one containing automatic rests. All parameters such as key signature, clefs, notation symbols etc are still shown. Any notes will be hidden from view, though they will still be seen in the event list and played via MIDI.

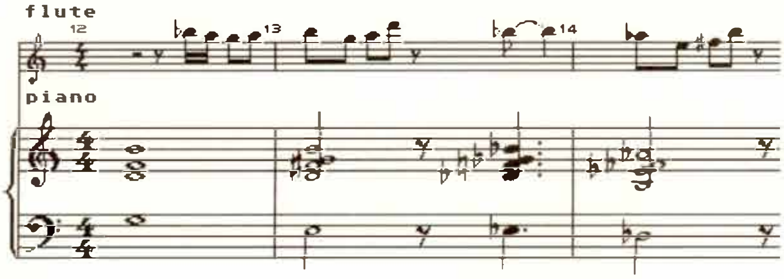
The function is intended to allow the mixing of handwritten and computer-printed notation.



22. “Miniature” mode

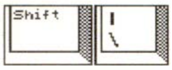
Each stave can be individually displayed and printed in miniature form (approximately half-size).

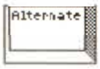
Press ‘M’ to miniaturize a stave, or tick “MINI” in the Parameter mode or Display Parameters windows. ‘Shift-M’ will miniaturize all the staves in the Full Score mode.

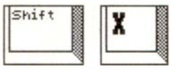


You can mix the display of normal-size and mini staves in Full Score mode.

Tip: switching a stave to mini mode allows you to see more of the stave on the screen, which can be useful when copying, moving etc.

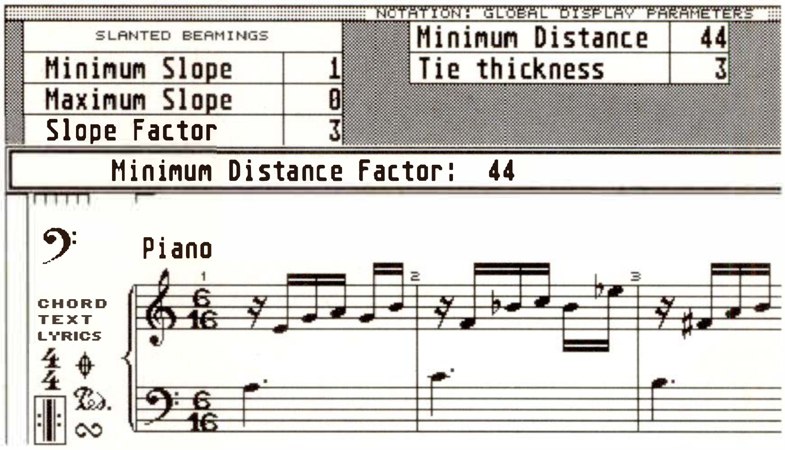
23. “Minimum Distance” function







The “Minimum Distance” value of NOTATOR’s score editor is coarsely set by pressing ‘\’ or ‘Shift-\’ (adding the ‘Alternate’ key increments/ decrements the value), or by altering the “Minimum Distance” value in the Global Score Parameters window (press ‘Shift-X’).



The horizontal position of notes and rests is determined by this “Minimum Distance” value. A small value reduces the space around notes and rests (especially in empty bars), whereas larger values will give notes and rests a space proportional to their lengths: a quarter note, for example, will get more space than a sixteenth note.

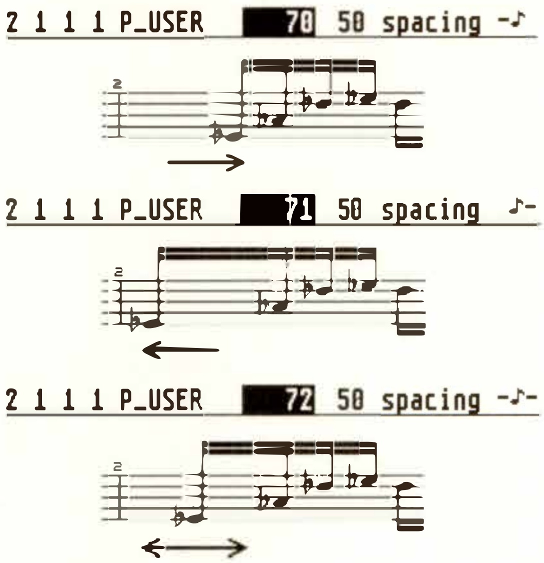
24. Events used for spacing

P_USER events 70, 71 and 72 are used to extend the space of *individual* notes’ positions.

P_USER 70:	increases the space to the left of the note
P_USER 71:	increases the space to the right of the note
P_USER 72:	increases the space both sides of the note.

Each P_USER’s “second data byte” determines the amount of space *(see also Chapter 8: “TYPES OF EVENT”, section 7 “Pseudo Events”).*

How to use: suppose you want to give a note more space to its left, so that a symbol underneath it has more room: in the event list, drag a P_USER event from the "PSEUDO" icon to the left of the list and place it exactly on top of the note. Scroll its "first data byte" to "70", then alter its "second data byte", starting from "0", to the desired value: you will see the space to the left of the note increasing.



25. Polyphonic display

25.1 The basics

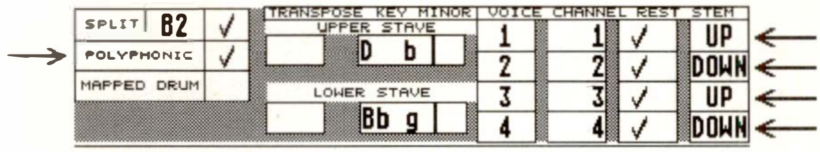
"Polyphony" is the ability to show rhythmically-independent parts or "Voices" in the same stave: each voice's stem direction and rest display is independently controllable.

NOTATOR is able to display up to four independent Voices in a track: three per single stave, four in a double stave (at two per stave). Each Voice is rhythmically-independent from the others, and each can contain individual chords.

The internal MIDI Channel of a note (the one you see in the event list's "CHANNEL" column) determines to which Voice it belongs.

25.2 Polyphonic parameters

The polyphonic display parameters are to be found in the Parameter mode window (press 'X'), where clicking "POLYPHONIC" switches the display on.



The "VOICE" boxes activate the four possible Voices:

- Voice 1 is the main voice of the upper stave (or of the single stave if there is no double stave). It is always active.
- Voice 2 is the second voice of the upper stave (or of the single stave if there is no double stave). Activate it by clicking its Voice number.
- Voice 3 is the main voice of the lower stave in a double stave. It is always active when "Split mode" is enabled.
- Voice 4 is the third voice of a single stave, or the second voice of the lower stave in a double stave. Activate it by clicking its Voice number.

Each Voice is independently subject to the following parameters:

CHANNEL: only those notes whose Channels match this value will belong to that Voice, irrespective of pitch. Of course, each Voice must be assigned to a different Channel so that the Polyphonic function can distinguish between them. Notes whose Channels do not match any of the Voice Channels will remain hidden.

In a double stave, if Voices 1 and 3 share the same Channel, the division between the notes in the score editor is determined by the Split Point. Apart from this special case, the division between notes is determined solely by Channel, independent of the Split Point *(see section 7 "Double stave" above).*

REST: each Voice has its own automatic display of rests: this is where the rest display can be disabled for each Voice. Where a stave displays both Voices, their rests will be displayed vertically, so that the upper rests are always Voice 1's or 3's, the lower rests always Voice 2's or 4's.

Rests entered by hand are unaffected by this Rest Disable and are moveable vertically.

STEM: this is where you can determine the direction of a Voice's stems. "AUTO" means that the stem direction is determined as usual by the pitch of the note. If you want a Polyphonic display, you should set the upper Voices (1 or 3) to "UP", and the lower Voices (2 or 4) to "DOWN" *(see section 13 "Note stems").*

25.3 Allocating Notes to Polyphonic Voices

Once the initial settings have been selected in the Parameter mode window, you can start assigning notes to their Voices.

For a note to belong to a Voice, its MIDI Channel must match the Voice's Channel.

To recap: the MIDI Channels of individual events (which you can see in the event list) are transmitted over MIDI only if the track's "CHANNEL" parameter in the main page is set to "original". If "CHANNEL" has a specific Channel number, all the events of that track will be sent to that Channel, whatever their individual events are (see Chapter 6: "TRACKS" for details). But the fact that the events have internal Channels means that the Polyphonic function can distinguish between them.

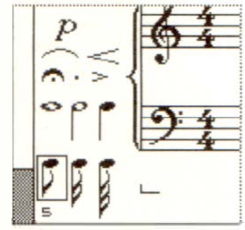
Summary:

- If a track's "CHANNEL" track parameter is set to a Channel 1-16, the MIDI Channels of individual notes can be freely changed to suit the Polyphonic function without affecting what is being transmitted via MIDI.
- If a track's "CHANNEL" track parameter is set to "ORIGINAL", then each polyphonic Voice will be sent via the different MIDI Channels to different instruments.

25.4 Allocating notes to Voices prior to entering them

Giving a note a Channel that matches a Voice's Channel ensures it will be shown in that Voice.

The "Partbox Channel": the MIDI Channel of notes and user-rests being entered with the mouse can be pre-selected via the little number in the bottom lefthand corner of the lefthand partbox.

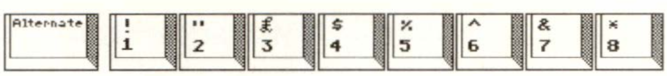
This number can be changed by clicking, or pressing 'Shift' with any of the typewriter pad's keys '1' to '='.

You could also use the transmit Channel of your MIDI keyboard as a way of allocating notes to Channels: playing in realtime using "Record-Merge" means you can play your different Voices in one after the other, each time adjusting the transmit Channel *(see Chapter 7: "RECORDING", section 3.2 "Merging into an already-recorded track").*

25.5 Allocating notes to Voices after entering them

The allocation of existing notes to Voices can be determined by changing their Channels. Apart from being able to alter the Channels of notes on an individual basis in the event list, there are various other methods you can use to alter Channels for use in the Polyphonic function.

25.5.1 Changing the Channels of selected notes

To change the Channel of a group of selected notes, hold 'Alternate' while tapping keys '1' to '8' in the typewriter pad (Channels 1-8).



25.5.2 Pitch-dependent Voice allocation in a double stave

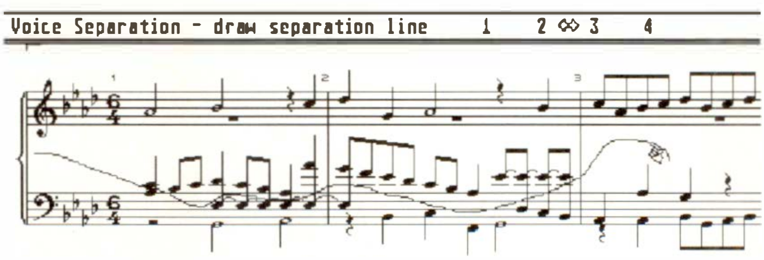
In a double stave, with Voices 1 and 3 set to different Channels, NOTATOR will assign notes to Channels automatically if you press 'Alternate-S': the split point will determine which notes belong to which Voice (above the split point, Voice 1; below the split point, Voice 3).

```
reassign voices:   whole sequence
```

25.5.3 Voice allocation using the flexible split point

The assignment of notes to Voices can also be determined by "drawing" a "Voice Separation Line" in the stave with the mouse.

With Polyphonic mode enabled, and a different MIDI Channel assigned to each Voice, click and hold with the mouse in the area just below, almost touching, the clef (if you are working in a double stave, between the clefs). The pointer arrow becomes a pointing finger. Now drag the mouse along the score, drawing the line around the notes to determine whether they belong to the upper Voice or the lower one. On releasing the mouse button, all the notes on the "wrong" side of the line will be changed.

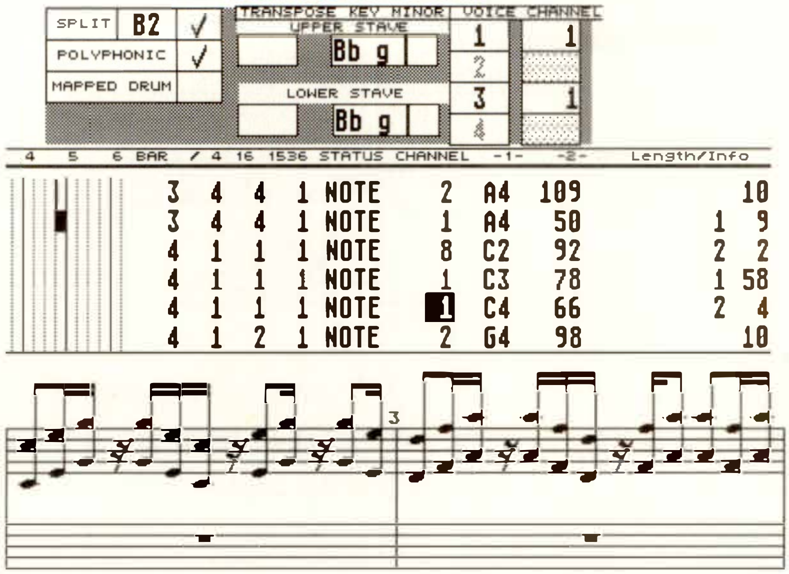


The Control Line reads "Voice separation – draw separation line" and tells you whether you are deciding between Voices 1 and 2, 2 and 3 or 3 and 4 (though this depends on the number of Voices enabled in the Parameter mode window). You decide between which Voices you wish to draw by clicking the right mouse button while holding the left one.

You do not have to continue drawing the line all the way to the other side of the screen: stopping part-way will simply mean that you will affect notes only as far as there.

25.5.4 Automatic "chord Voice" allocation

"Lines to Channels" in the "Functions" menu: notes in chords are given different MIDI Channels *(read Chapter 18: "COPY, MERGE, ..." section 8 "Separating by "chord Voice").*



25.6 Examples of Polyphony

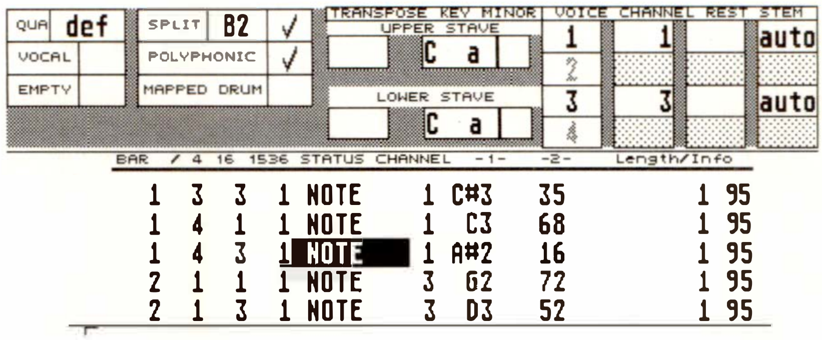
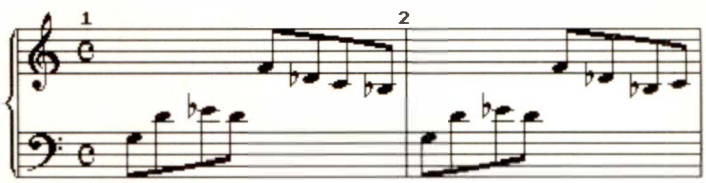
25.6.1 MIDI "Channel filter"

To display notes of a certain MIDI Channel only, enable "POLYPHONIC" and select the Channel in Voice 1 (and 3 if in a double stave) of the notes you want to "display solo". Voices 2 and 4 are not relevant to this example.

This is useful where you want to display and edit only one of the layers that were recorded while recording in the CYCLE mode *(Chapter 7: "RECORDING", section 4).*

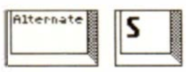
Or, you might want to remove individual notes from the display, just by altering their MIDI Channel in the event list so that they no longer match any of the Voices' Channels'; that way, you can "spot-erase" trills or arpeggiations from the display and replace them with the corresponding notation symbols, without affecting what is happening over MIDI.

25.6.2 Flexible split point



If, in a double stave, Voices 1 and 3 are given different Channels, the division of notes between the left and right hands is determined by MIDI Channel, not by pitch.

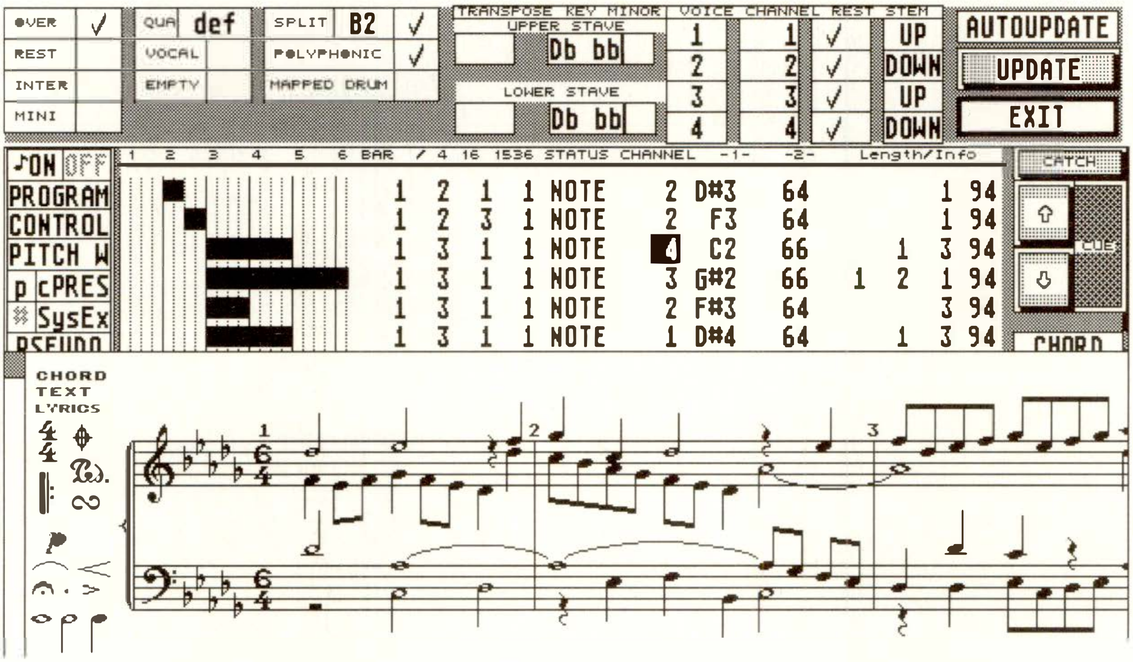
That way, a Middle C can be shown as belonging to the left or the right hand, depending on its Channel at the time.



You can use the 'Alternate-S' technique described above to assign the whole track to the left and right hands (where the split point decides the allocation), then "fine-tune" the notes' Channels to finalize the display. Or use the "flexible split point" technique described above to continue the job.

25.6.3 Multi-Voice phrasing

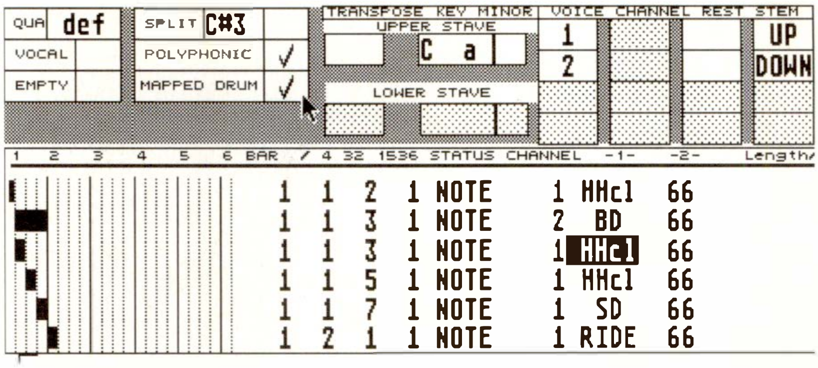
To display two independent Voices in a stave, enable Voices 1 and 2 in the Parameter mode window (and Voices 3 and 4 if in a double stave). Ensure that each Voice has a different Channel. You should set the stems of Voices 1 and 3 to go up, those of 2 and 4, down.

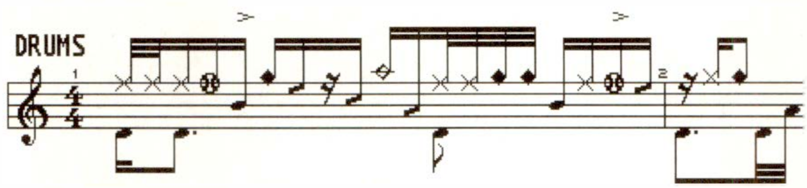


It also normally makes sense to switch off the automatic rests of Voices 2 and 4, and to enter user rests when you need them, ensuring you pre-select their correct Channel in the lefthand partbox.

26. Percussion notation

When working with percussion notation, it is often the case that the positions of the drum machine's/ sampler's voices on the MIDI keyboard do not conform to the desired pitches in conventional notation. You also require the special note heads.

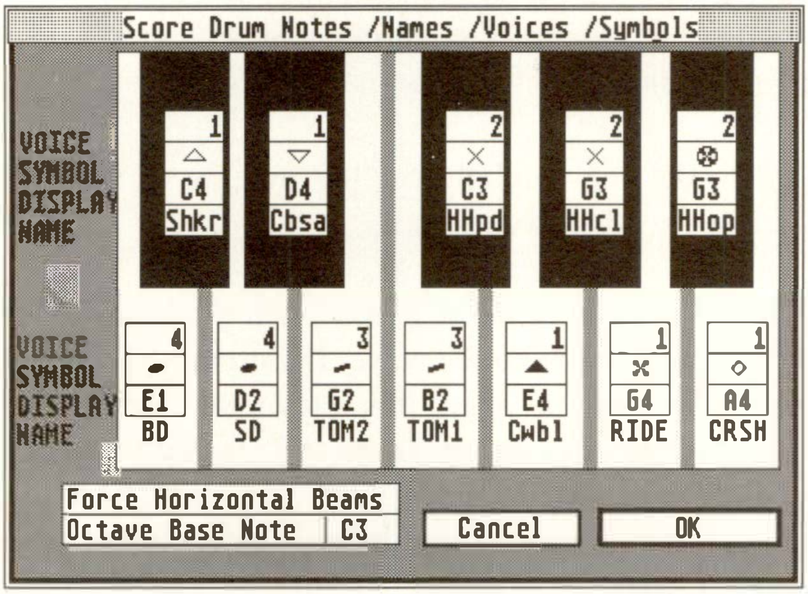




NOTATOR's "Set Drum Map" function allows you to determine the *displayed* pitches and symbols of percussion notes. Do not confuse this with the Mapping feature of the "Transform" function which alters MIDI pitch values *(see Chapter 24).*

In the "Set Drum Map" window in the "Options" menu, every MIDI note can be given a separate *display* pitch for the purposes of notation, a separate percussion symbol, assigned to one of the four Voices of polyphony, and the drum can be named in the event list. The assignment display can be enabled for each track separately.

You will still play the drum notes where they are: what you are able to change is the pitch at which they appear in the score, their symbol, the Polyphonic voice to which they should belong (for stem direction), and you are additionally able to have the event list display what the drum is instead of a simple note.



What to do: the "Set Drum Map" window represents one octave of a keyboard, with each key having a set of parameters on it. The "Octave Base Note" determines the octave of the keyboard you are looking at.

First find out which of your drums is played by which MIDI note. The "Set Drum Map" window allows you then to enter the information you wish to be displayed. For example, if the snare is played by D3, scroll the "Octave Base Note" to "C3" and enter the values you require in the graphic D3 key.

VOICE: (only with Polyphonic mode enabled): the number of the Voice to which this note is to belong. This allows the choice of stem directioning. When "DRUM MAPPING" is enabled in the track's display parameter window, the stem direction is not decided by the MIDI Channels of the notes, but by which VOICE they belong to in the Set Drum Map window. The Parameter mode window is where you select stem direction etc.

SYMBOL: the symbol that the note is to receive. Click the symbol to change it.

DISPLAY: here, choose which pitch you want your MIDI note to have on the stave. Different MIDI notes can share the same pitch; this allows the correct display of open and closed hihats, which normally occupy different MIDI notes: now they can share the same pitch in notation, and differ only as to their note head symbols.

NOTATOR's "Set Drum Map" window uses the "Transform" function's "Universal Map 5" to do its display mapping. You can edit the map directly if you prefer *(see Chapter 24: "TRANSFORM").*

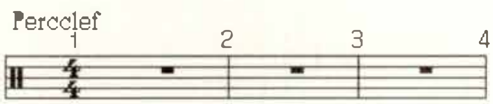
NAME: In this line, you may enter a name of up to four letters, which then replaces the pitch letter. With "DRUM MAPPING" enabled in the track's Parameter mode window, this name will appear in the event list in place of the note's pitch. If you do not enter a name, the default note pitches which you can see in the name spaces ensure that the displays of non-assigned notes remain unaltered in the event list.

No changes are made to the score until you switch on "Mapped Drum mode" in the "Edit" menu, or click "MAPPED DRUM" in the Parameter mode window.

"Force Horizontal Beams" forces the display of horizontal beams on the percussion stave without affecting the other staves.

All Drum Mapping parameters are saved with a Song. You may find it useful to include them in your AUTOLOAD.SON *(see Chapter 28: "DISK OPERATIONS", section 2.3).*

26.1 Percussion clef

Tracks whose Mapped Drum mode is active may be given a percussion clef, by activating the "Display Drum Clef" panel in the "Options" menu's "Set Drum Map".

26.2 Single line staves

The single line stave is a convention required for many applications, and is selected in the Parameter Mode window via the panel marked "Single Line". A double stave can consist of two single line staves.

The single line represents the middle line of the 5-line stave. Leger lines and accidentals are displayed as usual.

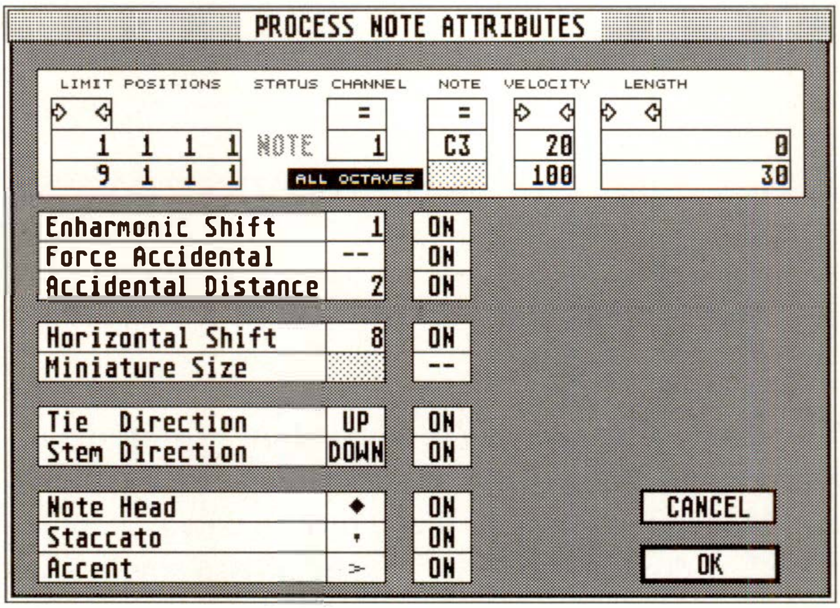
NB: If a percussion stave contains the notes of one single-pitch instrument (conga etc), you can use the display transposition function in the Parameter Mode window to display them on the single line. Where more than one instrument is involved, use the Drum map function.

27. Process Note Attributes

27.1 The basics

The "Process Note Attributes" function allows attributes such as enharmonic shift, accents, staccato dots etc to be applied to all notes in a track or to a limited segment within the track, or to be deleted again. This is possible in a single operation.

The way this functions works is similar to the TRANSFORM function *(see Chapter 24: "TRANSFORM")*.



27.2 The window's structure

Access "Process Note Attributes" via the right-hand "Functions" menu.

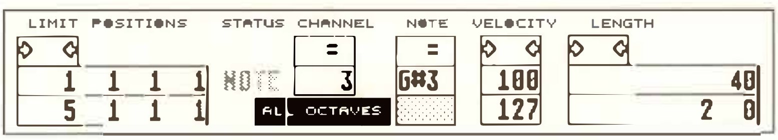
The upper section allows the setting of conditions relating to the segment, length, pitch, velocity and MIDI Channel of the notes that need processing. The functions described below affect only notes which satisfy the conditions you have set.

The lower section is divided into three columns. To the left are the attributes, in the middle are the input boxes for the values or choice of symbols and noteheads, and to the right are the switches (--/ON) that enable the attributes.

27.3 Defining the conditions

There are five boxes in which conditions can be set:

"*"	All/any values
"="	This value only
"→ ←"	Between these two values
"↔"	Outside of these two values



These conditions may be applied to the following criteria:

LIMIT POSITIONS: a zone may be determined by setting a "left" and "right" locator value in the upper and lower boxes, within which, or outside which, notes will be processed. If the condition is "=", the position criterion is set in the upper ("left locator") box.

CHANNEL: notes may be processed according to their MIDI Channel (1-16), or the Channel can be ignored if the condition is "*".

NOTE: determines the pitch of the notes, which can be over a range, or one particular pitch. If a single pitch is selected, the "All Octaves" button allows that pitch to be included over all the octaves.

Example: enharmonic shifting of all G# whatever their octave.

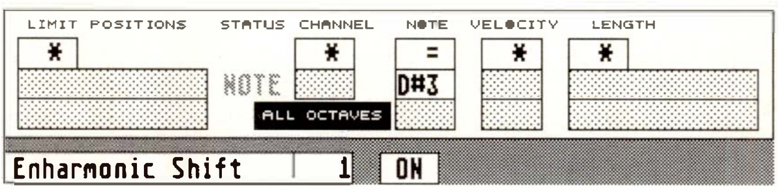
VELOCITY: determines whether, and which, velocity values should form part of the criteria.

LENGTH: determines whether, and which, lengths should form part of the criteria. Similar in operation to LIMIT POSITIONS with regards to the conditions.

27.4 Functions

These functions operate only on those notes that satisfy the above conditions. More than one function can operate simultaneously.

ENHARMONIC SHIFT: shifts the enharmony (-2 to +2). Useful when applied to one note (condition: "=") with "All Octaves" enabled, as in shifting all Eb to D#.



FORCE ACCIDENTAL: the display of confirmation accidentals.

ACCIDENTAL DISTANCE: the distance between the note and its accidental.

HORIZONTAL DISTANCE: graphical microshifting *(see sections 5 and 6.4).*

Accidental Distance and Horizontal Shift are more usually used on single notes; however, Process Note Attributes allows global manipulation for special applications. It also allows the easy deleting of all existing microshifting in a track.

MINIATURE SIZE: miniaturized display of notes that satisfy the conditions.

Example: cue notes on a certain MIDI Channel when Polyphony is enabled.

TIE DIRECTION: the bend-direction of any ties.

Example: you may wish the ties of all notes above E3 to go upwards.

STEM DIRECTION: stem direction.

Example: the stems of all notes below F4 should go upwards.

NOTE HEAD: the symbol of the notehead, selectable in the value box.

Example: all B3's should receive a different notehead, or, for example, the "non-printing" notehead (the speckled oblong).

STACCATO: you can choose the required symbol.

ACCENT: several symbols are available.

Processing a track (that was recorded live) using Staccati and Accents can be very useful.

Example: all notes of velocity 100-127 can be given an accent. All notes whose lengths are from 0 to 30 can be assigned a staccato symbol. *See also Chapter 12: "SCORE SYMBOLS", sections 8 and 8.2.*

27.5 The OK button

Clicking this activates the whole window and applies the functions to the current track. Remember: more than one attribute/symbol can be processed at the same time.

27.6 Deleting attributes/symbols

These can be deleted, more than one simultaneously.

Example: to delete all staccato symbols after your experimenting went a bit wrong (!), set a blank in the box where you would normally have the staccato symbol, and switch the function line to "ON".

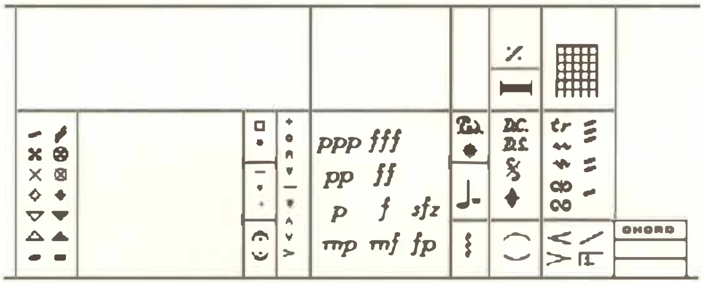
NB: If the delete operation is to apply to all notes, make sure that all the conditions boxes are set to "*".

12. Score Symbols

12. Score Symbols

12. Score Symbols

NOTATOR offers a whole range of graphical signs and symbols which can be entered into the score.



1. Entering

Graphical symbols can be entered from either part-box into the score.

There are two things to be aware of when entering them:

- The time position of a symbol, seen in the Control Line while still holding the mouse, should be made the same as the nearest note or rest - ideally, the note for which it is intended.
- In Full Score mode, ensure that you are entering the symbol in the correct track (watch the track name in the top left corner of the screen).

The position of a symbol is affected as follows:

- The vertical positions of symbols in a double stave are related to the positions of the upper stave's notes (apart from the Pedal signs). Therefore try to make the distance between the two staves and any parameters that affect the vertical position of the notes (clefs, transposition) as definite as possible before entering notes.
- The horizontal position of a graphical symbol is dependent on:
    1. the position of the symbol by reason of its being a P_USER event with its own time position;
    2. any graphical microshifting you carry out.

Do ensure that symbols are entered at the same time positions as those of notes or rests: that way, the positional relationship between symbols and notes is not changed if a bar width is altered, eg as a result of adding more notes into the bar or enabling/disabling Full Score mode.

2. Moving

Symbols can, like notes, be moved singly or in groups with the mouse, even in the same group as notes. As with notes, their time positions change when moved horizontally.

Dragging symbols while keeping 'Shift' depressed allows you to copy the objects to another destination.

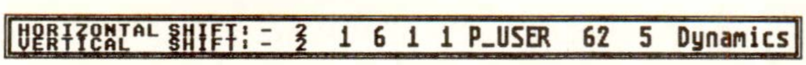
3. "Graphical microshifting"

Pressing 'Alternate' while dragging a symbol left or right lets you slightly move it without affecting the event's time position (watch the "HORIZONTAL SHIFT" value in the Control Line.

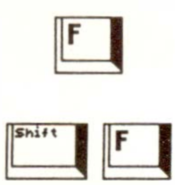
Thus, for example, overlapping Pedal signs can be separated without altering the events' MIDI time positions.

Tip 1: "Graphical microshifting" should be reserved for small changes in position only: you should always place the signs at the correct time position first (that of the nearest note or rest) and only then should you microshift to "fine-tune" the position, if necessary.

Tip 2: The "VERTICAL SHIFT" parameter in the Control Line that you see when you press 'Alternate' and drag a symbol shows how much you are dragging the symbol up/down: the "TRANSPOSE" parameter you see when you drag a symbol without 'Alternate' does the same thing: they are the same function, except that their scales are different. So, to move a symbol vertically, it makes no difference whether you press 'Alternate' first or not: you get the same result.



4. Vertical formatting



The 'F' key helps ensure that events of the same P_USER number share the same height.

Select the first object and move it to the desired vertical position. Pressing 'F' will move the next identical object to the same height as the first: you can go on pressing 'F' for more objects, or pressing 'Shift-F' formats all the identical events in the whole track with just one command.

The following events are vertically formattable:

P_USER 58:	guitar chord
P_USER 59:	chord symbol
P_USER 60:	text
P_USER 61:	lyric
P_USER 62:	dynamics
P_USER 63:	crescendo/decrescendo
P_USER 65:	segno
Control 64:	Pedal signs

Tip: be careful with Text and Lyrics - you cannot format more than one line. If you use the SNAP function (see next Chapter 13), you should not need to use Vertical Formatting anyway.

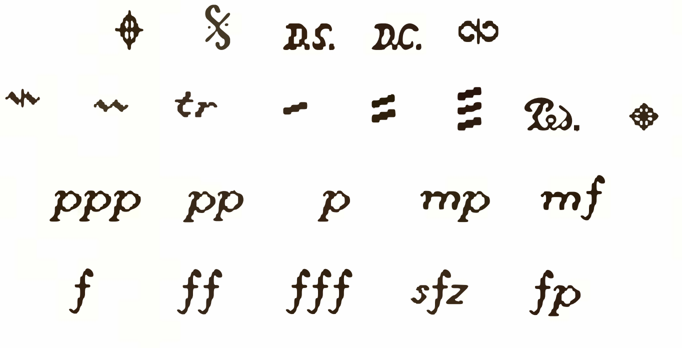
5. Deleting

Like notes, symbols can be deleted by dragging them in any direction to the borders of the score editor, or pressing 'Backspace'.

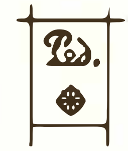
6. Dynamic and repeat signs

Dynamic signs and repeat signs can be entered where you like in the score. They have no effect on the MIDI output or sequence structure *(compare with section 8.2 below).*

The following symbols are available:



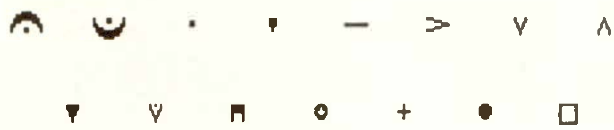
7. Pedal signs



The pedal signs (on and off) relate directly to MIDI Controller 64 (sustain pedal). After you have entered a pedal-on sign, NOTATOR will automatically select the pedal-off sign in the partbox, so that pedal movements can be quickly entered without continuous recourse to the partbox (use the right mouse button for fast entering).

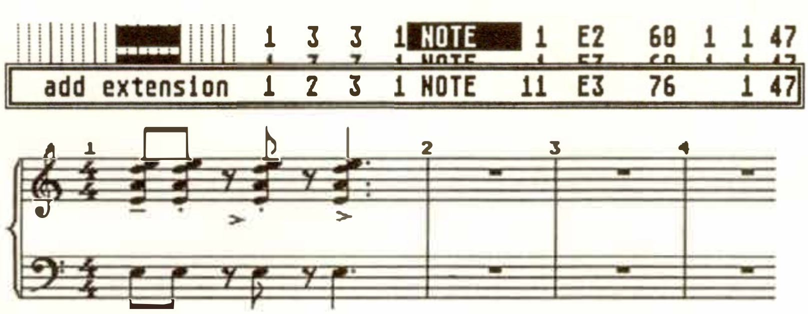
Manually-entered pedal signs can be vertically formatted *(see section 4 above);* played-in pedal signs cannot.

8. Fermata, handgrip, accent and staccato signs



8.1 These signs as "note extentions"

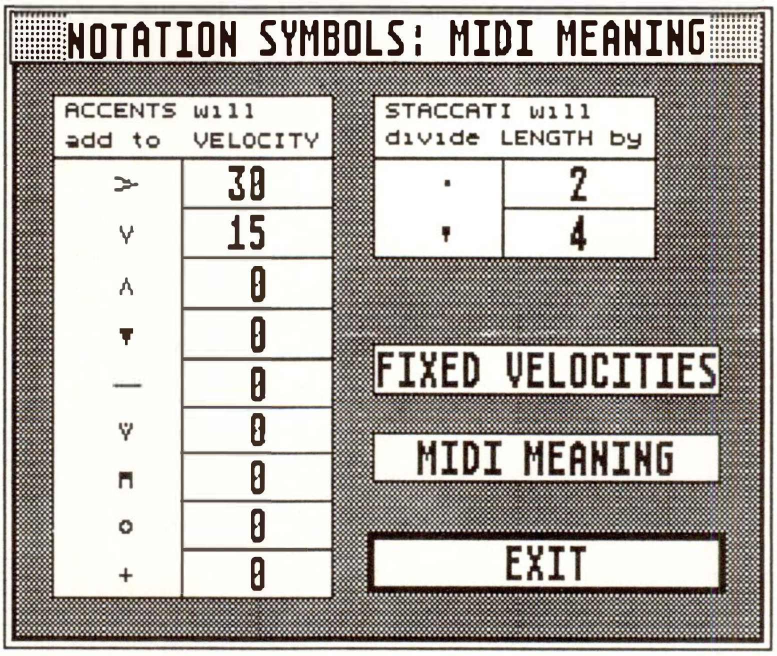
These symbols are "extentions" of the note for which they are intended. Their positions are relative to the pitch and position of the note: they "belong to" the note for which they are intended. Any change to the note such as transposing, moving, copying or deleting will automatically affect these symbols. For special situations, they can be entered as independent P_USERs *(see section 8.3 below).*

To assign one of these signs to a note, select the sign in either partbox and enter it onto the note, so that the note's time position appears in the Control Line. The exact position of the sign itself is determined by NOTATOR.

To assign a sign to a group of notes, select the notes and enter the sign onto one of the flashing notes.

A note can be given more than one sign; a chord can only receive one of each of the signs.

8.2 "MIDI Meaning" of accent and staccato signs

"MIDI Meaning" means being able to affect the MIDI output of notes (in this case, velocity and note length) by use of the accent and staccato signs. Find "Set MIDI Meaning" in the "Options" menu.



In the "MIDI Meaning" window, the function can be switched on/off with the "MIDI MEANING" icon, so you can use the signs without them affecting the MIDI notes.

If "MIDI MEANING" is switched on, entering or deleting an accent or staccato sign causes a little box to flash around the note head to remind you.

Each accent sign can be given its own velocity effect, which is added to the note's existing velocity when the sign is entered. If the "FIXED VELOCITIES" icon is switched on, the accent's velocity value replaces the note's original velocity. In both cases, deleting the accent restores the note's original velocity.

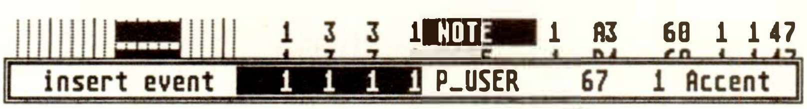
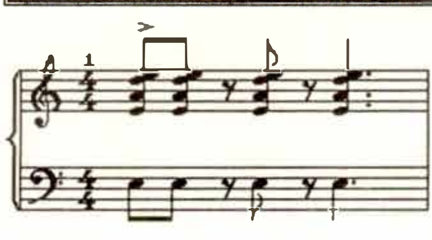
Each staccato sign is given a dividing value, which divides the note's MIDI length by the given value; deleting the sign restores the note's original length. The score display of the note remains unchanged by the change of MIDI length.

Manually entering these signs can affect the MIDI output: it does not work the other way around - NOTATOR cannot recognize your style of playing and automatically enter them.

Tip: do not forget to decide, before entering these signs, whether or not you wish the MIDI output to be affected.

8.3 User-positioning these signs

Entering these symbols while pressing 'Alternate' makes them into independent P_USER events, allowing them to be placed wherever you choose.



Fermata, for example, may be placed over a rest, a bar line etc. MIDI Meaning will no longer apply to accent or staccato signs, nor will you be able to enter a sign for a group of notes at a time.

9.Slurs

Slurs may be freely entered and their shape edited.

To enter a slur, first select the type of slur you require (bowing upwards or downwards), drag it in, positioning the lefthand end of the slur at the required position (so that it shares the time position of a note). By releasing the mouse button and just moving the mouse, you are then able to set the other end of the slur where you like. Clicking the left mouse button again will confirm the entry: while keeping the left mouse button depressed, you are able to alter the amount of "bend" of the slur by moving the mouse backwards or forwards.

Existing slurs can be edited as follows:

- dragging the slur by its left extremity moves the whole slur.
- "Graphical microshifting": while holding 'Alternate', the lefthand end of the slur can be dragged without this affecting the slur's time position (the righthand end remains where it is).

- dragging the highest/lowest point of the bow changes the height of the bow;
- dragging the righthand extremity edits the end position.
- to alter the thickness of the slur, alter the "Slur thickness" value in the "Global Score Parameters" window ("Edit" menu).

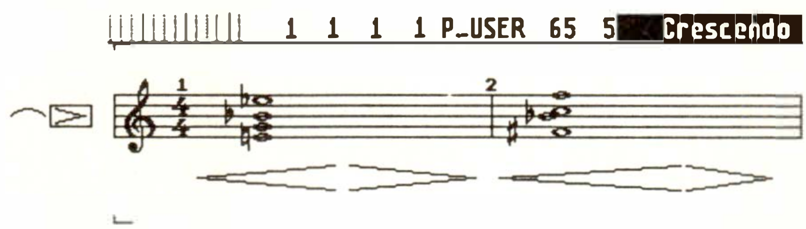
Note: ties, which appear when you lengthen a note (eg when straddling two bars), are automatically entered by NOTATOR and cannot be altered.

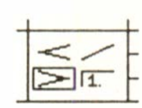
10. Crescendo hairpins; lines; "first etc time repeat" sign

Crescendo/diminuendo signs may be freely entered and their shape edited. The operation is very similar to that of entering slurs.

To enter a cresc/dim hairpin, first select the type of sign you require (opening to the left or right), drag it in, positioning the lefthand end of the sign at the required position (so that it shares the time position of a note). By releasing the mouse button and just moving the mouse, you are then able to set the other end of the sign where you like. Clicking the left mouse button again will confirm the entry: while keeping the left mouse button depressed, you are able to set the angle of the opening (watch the Control Line) by moving the mouse backwards or forwards.

Editing an existing hairpin follows the same rules as slurs (see above).





The line sign can be used for many different jobs - entering it is straight-forward as it follows the same rules as slurs and hairpins.

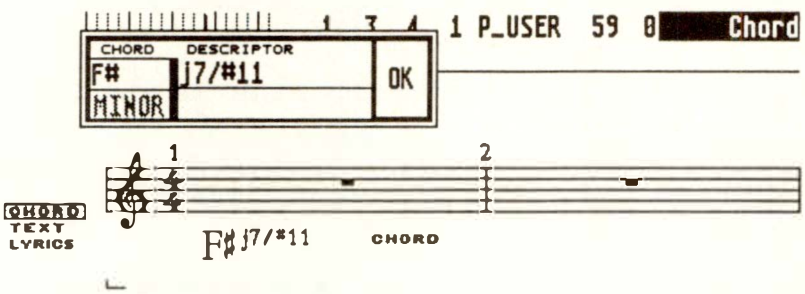
The "first/second etc time repeat" sign is also intuitive: place it above the desired bar and release the mouse button. You can now move the mouse down and to the right so that the size is correct; when you left-click, the text-window opens so that you can type in the number.

The sign is editable in both directions; dragging it by the corner moves it. It has no effect on the MIDI output.

11. Chord symbols

Chord symbols (select "CHORD" in either partbox) may be inserted with either mouse button at any desired location. A box will appear when you release the button in which you can type the chord and its description.

The "MINOR" icon in the input window determines whether the chord letter appears as a capital letter or not.



The descriptor can be typed on the upper or the lower line, or both.

Chords are automatically transposed, just like notes, if you transpose the display (use the "TRANSPOSE" box in the Parameter mode window), and will correctly reflect the current key signature.

You can even "enharmonically shift" the display of the chord by using 'H' or 'Shift-H' *(see Chapter 11: "SCORE DISPLAY", section 16.3).*

The font and size of Chord symbols is selectable in the Fonts window ("Edit" menu) *(see Chapter 13: "TEXT/LYRIC FUNCTIONS", section 6 on fonts).*

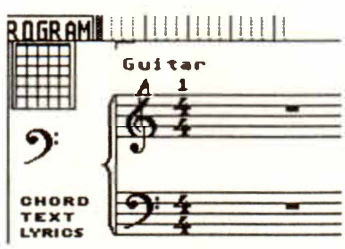
12. Guitar tabulature symbol

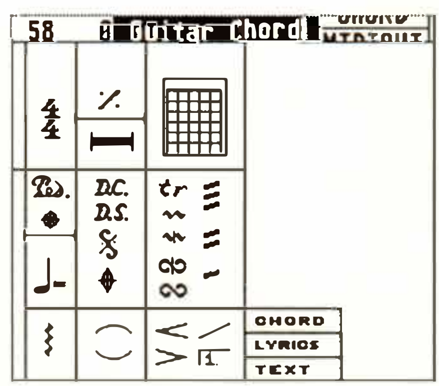
This symbol is selected from either partbox and entered into the score in the usual way; short left-clicks on the grid enable you to enter the desired fingering spots (another left-click deletes them).

Clicking just above each "string" of the grid allows the entering of a "stopped" or "open" symbol. To show fingering further up the neck than the grid allows, insert a small "Text" *(see next Chapter on Text entering)* number to the left of the "nut" to indicate the position of the barré.

To move the symbol, click and hold it. When the mouse hand appears, then you can move it.

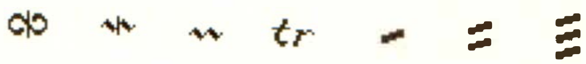
'Esc' allows you to alter the name of the chord above the tabulature; this chord is auto-transposed if you transpose the notation display *(see section 11 above for details)*.



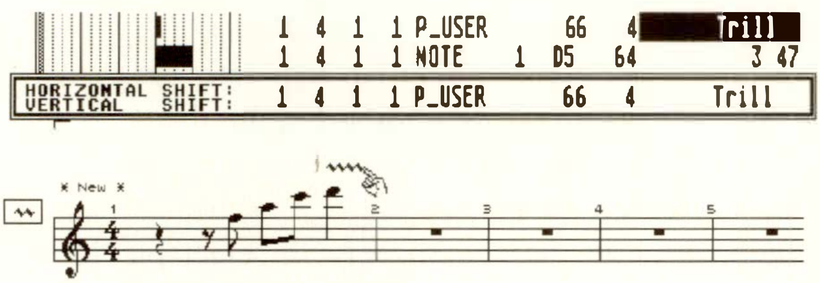


13. Trills and ornaments

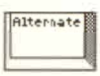
Trill signs are entered onto the stave as usual. They do not affect the MIDI output.



The zigzag trill symbol's righthand end can be dragged to lengthen the symbol.

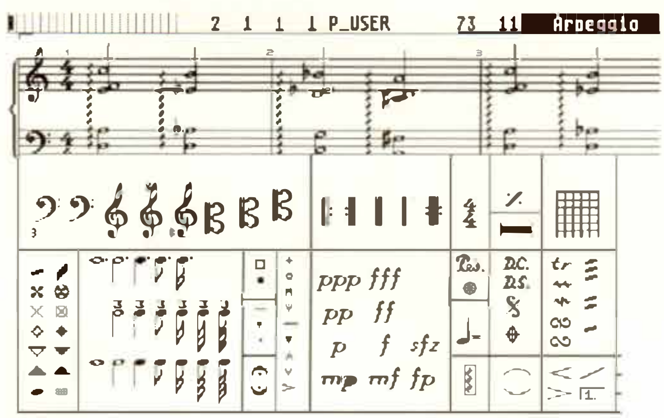


14. Arpeggio/ broken chord symbol

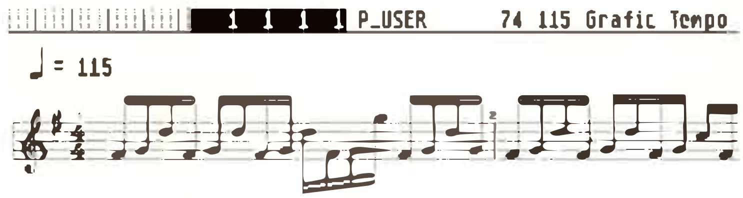


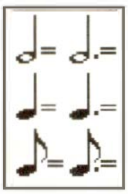
Enter this symbol as usual, and position it at the same time position as the chord to which it applies. It has no effect on MIDI data.

It can be lengthened by dragging its lower end downwards. If necessary, use "graphical microshifting" (press 'Alternate' while dragging) to move the chord and symbol away from each other.



15. "Note = tempo" sign





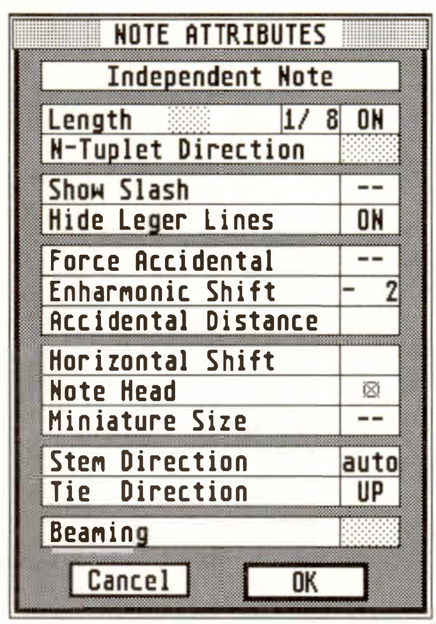
The pop-up partbox contains a number of choices. When one of these signs is entered into the score editor, its tempo is that of the sequencer's tempo, or a multiple thereof depending on the note value. This can be changed in the event list in the P_USER event's "second data byte".

The font of the tempo display is selectable in the Fonts window *(see next Chapter).*

16. Notes as graphical objects

16.1 "Independent" notes

"Independent" notes are notes that have been removed from the rhythmical context. They may be freely positioned as universally-useful objects, and used in many different applications without affecting other notes. They are transmitted over MIDI as usual.



The conversion of a normal note into an "Independent" note is as follows: double-click the note, which opens the Note Attributes window, and activate the panel marked "Independent Note".

In addition to the attributes described in *Chapter 11: "SCORE DISPLAY", Section 6.4 "Note Attributes window"*, the following attributes additionally apply:

LENGTH: the length of the independent note is determined here after switching the attribute to "ON" (1/1 to 1/64). If the length is set to "- ", the original note length remains valid, which can be edited in the event list as usual. The note length is totally independent of the display format.

Simple note lengths only will be displayed, not dotted notes.

SHOW SLASH: determines whether the note's stem should have the cross-slash line which characterizes a grace note.

HIDE LEGER LINES: if on, the independent note's leger lines will not be shown.

The automatic display of accidentals and the enharmonic shift of the independent note remain as before. The notehead is freely determinable, though any drum map setting will be ignored.

TIE DIRECTION: determines the direction of the (graphical) independent tie that binds the independent note to the next note.

NB: the independent note will not give any MIDI output when the note is clicked or moved; however it will play normally during sequencer playback.

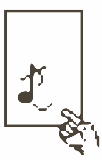
16.2 "Independent" grace note

A grace note, recorded in realtime, may be correctly displayed without having to change the note's MIDI output.

"Show Slash" and "Miniature Size" produce a grace note whose length can be determined when selecting the note from the partbox, via the N-Tuplet definition or by altering the length in the event list.

"Tie Direction" (see above) determines the tie direction with the next note.

16.3 Graphic notes



As an alternative to "Independent" notes, a grace note can also be entered from the pop-up partbox.

This graphic note has no MIDI output, since it is based on a P_USER 75 event; in every other respect, the graphic note's functions are identical to those of the independent note.

Graphic notes are not output over MIDI.

NB: Independent and graphic notes cannot be dotted notes.

13. Text/Lyric Functions

13. Text/Lyric Functions

1. The basics

Apart from the text that is automatically entered by NOTATOR (track names, bar numbers etc), there are two P_USER events that allow you to write directly into the score:

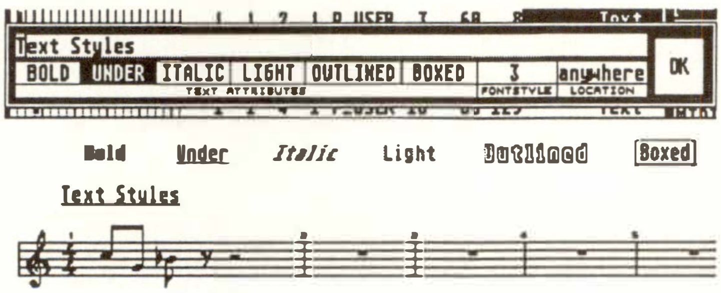
TEXT: freely-positionable P_USER 60 Text, which is independent of notes on the stave.

LYRICS: these P_USER 61 events affect the position of notes on the stave.

There is a range of fonts and text attributes at your disposal.

2. User-positionable Text events

Drag the "TEXT" symbol from either partbox to the desired position. On releasing the mouse button, a window will appear in which you can type your text.



The little number to the right of "TEXT" allows you to pre-select the font style ***(see section 6).***

TEXT ATTRIBUTES: under the text input line, certain attributes can be chosen:

BOLD
UNDERLINE
ITALIC
LIGHT
OUTLINED
BOXED

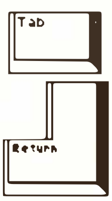
The "FONTSTYLE" box allows the selection of one of 16 pre-loadable fonts *(see section 6 below)*. This defaults to the value set by the little number to the right of the "TEXT" icon.

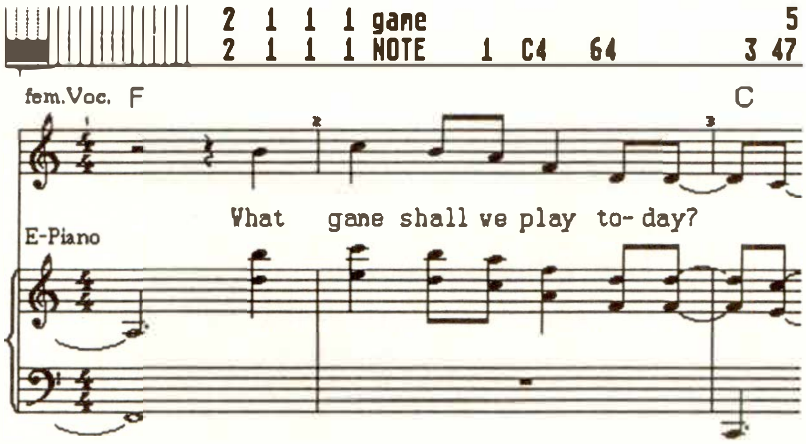
The "LOCATION" box determines whether the text will appear to the left, right or at the centre of the screen (useful when preparing a title), or whether it is positionable anywhere by you.

The text line in the event list shows the text itself, and at the righthand end, the font style you have selected.

3. Lyric events

As well as Text events, which can be placed anywhere, you can use Lyric events which automatically adjust the notation relative to the lyrics you enter.



To enter Lyrics, drag the "LYRICS" symbol from either partbox and place it under the first note of the melody: ensure "SNAP" mode is on (look in the Control Line). A little underlining cursor will appear: type your first syllable; press the 'Tab' key to advance the Lyrics cursor to the next note - that way, you can type whole lines of Lyrics without a break. Leave the Lyrics mode with 'Return'.

To advance the Lyrics cursor past a note that needs no Lyric, press 'Tab' again: the same applies to jumping past rests and dotted notes.

A Lyric will be auto-centered under its note, though by using "graphical microshifting" (press 'Alternate') its horizontal position relative to the note can be changed.

You are well-advised to always use the "SNAP" method of entering Lyrics *(see Chapter 10: "SCORE EDITOR: BASIC FUNCTIONS", section 5.4):* **click the other mouse button while entering the Lyrics cursor so that the Control Line says "SNAP". The Lyrics cursor will now be "quantized" to one of the evenly-spaced horizontal (and invisible!) "SNAP Lines" on the screen. This makes it easier to add more Lyrics to the end of an existing line, or to add evenly-spaced lines under existing ones, since your positioning of the Lyrics cursor can be a little more approximate.**

The little number to the right of the "LYRICS" symbol in the lefthand partbox presets the Lyrics to a particular font style *(see section 6).* The Lyric line in the event list shows the Lyric itself and, at the righthand end, the font style you have selected.

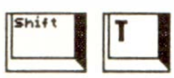
Tip: while in the Lyrics mode, the mouse pointer will disappear and the screen appear to be frozen: as soon as you press 'Return' once you have entered the Lyrics, it comes back to life.

4. Editing Text/Lyrics

Existing Text/Lyrics events can be treated as any other graphical symbol: they can be moved around at will, even by using "graphical microshifting" with 'Alternate'.

To amend the text, its attributes or fonts, click the text to start it flashing then press 'Esc, or double-click the text on the stave.

Text attributes or font styles can be changed globally using the "Fast Transform" principle *(see Chapter 9: "EVENT EDITOR", section 18):*



Font Style: to change the style of the current event and all the following ones, place the cursor on the font number in the event list and press 'Shift-T'; 'T' copies the value to the next event only.
Attributes: to alter the attributes, first switch on the "number" "#" sign in the event list display filter: this shows, in the event list, the details of the Text/Lyric events. The attributes are edited by altering the "second data byte" value: by placing the cursor on the value in the
"-2-" column and pressing 'T', the next event will receive the same value. 'Shift-T' applies it to all the subsequent Text/Lyric events in the track.
You can change the font style from here as well: when the "number" "#" symbol is on, the P_USERs' "Channel" value represents the font style.

5. Changing Text events into Lyric events

You can freely change existing "Text" into "Lyrics" (thereby gaining the advantage of automatic spacing) and vice versa by changing a Text's "P_USER 60" event in the event list into "P_USER 61". To do so, first switch on the "#" "number" symbol to see details of the P_USER events.

6. Down-loadable Text/Lyric fonts

6.1 The basics

NOTATOR allows up to 16 different fonts to be simultaneously shown on the screen. As well as the 3 in-built text fonts of the Atari ST, 13 further external fonts can be down-loaded from hard disk or floppy disk. Fonts are only compatible if in the Atari "*.FNT" GDOS format (but you do not need GDOS drivers).

NOTATOR comes with a couple of font styles of different sizes and designed for the three standard printer types, 9-pin, 24-pin and laser/DeskJet. However, there are literally hundreds of compatible GDOS fonts on the market, plus font editors that let you make up your own fonts. This whole area is well beyond the scope of this manual, but NOTATOR gives you the possibilities of "tapping into" the world of fonts.

"Down-loadable" means "capable of being loaded from disk when required".

In practice, use of a hard disk makes working with any "down-loadable" files more efficient, in that the loading is done in a flash, giving the impression that the files are part of the program, and not down-loaded; also, you do not need to swap from program to fonts disks since a hard disk can store all the data in one partition.

If you feel you are going to use NOTATOR's score facilities and make full use of the fonts, you must be aware that the font files you load have a certain size, which uses up your available RAM. You do not have to load the fonts until you require them, but even so, and especially if you are using the high-resolution fonts for use with a laser printer, 1 MB of RAM may prove to be insufficient to hold both the fonts and your music. Bear this in mind while you study this Chapter, if you own a 1 MB Atari.

In a nutshell: features such as down-loadable fonts are at their best, from a user's viewpoint, when used with a hard disk and sufficient RAM.

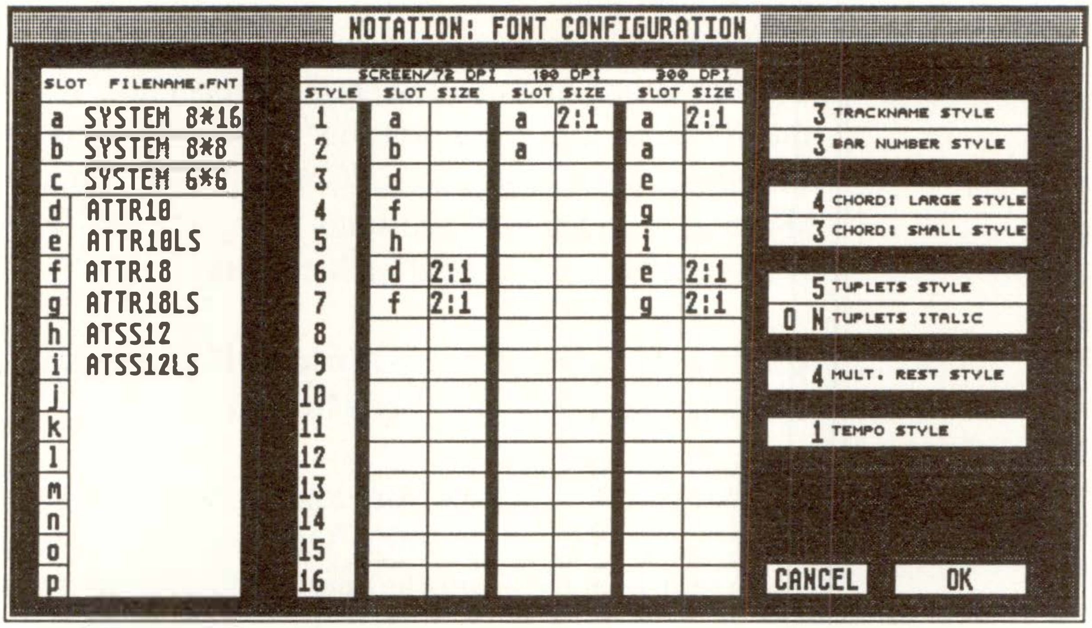
However, included in the Fonts window is a whole range of sizing parameters that allow users with little RAM to spare to have good-looking fonts of different sizes: this does not take up much room, allows you to have large and small fonts, though the "quality" of the enlarged fonts will not be as high as using the official large fonts. Using the sizing parameters means that you may be able to store the "source" font (which is then sized to the required size) on the NOTATOR program disk, cutting out the need to swap disks.

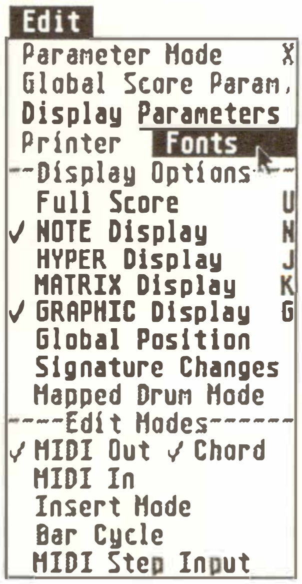
Because of the way in which text fonts work, users with 9-pin dot matrix printers use up less RAM than those with 24-pin printers, and far less than users with laser printers; but the assumption is that those with lasers will tend to be professionals with a greater RAM capacity and maybe a hard disk.

You do not have to use these fonts: they simply help to make your music look more professional on paper.

6.2 Setting the font configurations

Setting the font configurations is done in the "Fonts" window in the "Edit" menu, which is accessible from both the main page and the event editor.





There are 16 available "slots", each able to contain one font. The contents of the slots are to be seen in the lefthand box of the Fonts window. Slots "a" to "c" are permanently assigned to the Atari ST internal fonts:

Slot a: Atari normal size
Slot b: Atari medium size
Slot c: Atari small size

Slots "d" to "p" are for the down-loadable fonts. By assigning these slot letters to "style" numbers in the middle box, you can choose which style should be used by which text or lyric in the score editor.

To load a font into a slot, left-click in the "FILENAME" space of that slot. The File Selector box appears displaying the choice of fonts. All fonts must be in the same folder.

A right-click on a slot's filename deletes it.

Selecting a slot's contents in the File Selector box and clicking "OK" does not, of itself, load the font into the program.

The fonts are only loaded into the program when the "OK" of the Fonts window itself is clicked, at which time you will see a "Control Line" appear showing the names of the fonts being loaded. This is a very quick process with a hard disk.

Clicking the slot letter itself makes it go black, indicating that it is temporarily "muted".

This stops the program from loading the font when you click the Fonts window's "OK". Use this feature when you wish to preset the font configuration without also loading the fonts into the program. This is useful, for example, where you preset the window with fonts for all three types of printer with the whole range of sizes, but wish to make the actual decision of which fonts to use for the job in hand at the last minute, not at the outset; in this case, you would mute all the fonts except maybe for the "screen" fonts *(see below)* and make the Fonts window part of your "AUTOLOAD.SON".

6.3 Defining the "styles"

The 16 possible "styles" are defined in the middle box in the Fonts window. Each printer resolution can be given its own font ("SLOT" column) and scale factor ("SIZE" column).

The font on the screen is the same font file as the one for 72 DPI (dots-per square-inch) printers. This is the font you see, the "visible" font. 24-pin and laser printers see the fonts you set in their respective sections *(see below)*: these fonts are "invisible" to you. For example, if you have a 24-pin printer, you will normally define your screen fonts (so that you can see what the score looks like with them) and define the equivalent 24-pin font for each screen font in the second section (so that the printout will appear correct).

There are different font resolutions to suit the different types of printer *(see also next Chapter)*:

SCREEN/72 DPI	used for the screen, 9-pin printers without micro-feeds, and FIXED FONT 1.
180 DPI	used for 9-pin printers with micro-feeds, 24-pin printers without micro-feeds, and FIXED FONT 2.
300 DPI	used for 24-pin printers with micro-feeds, laser/DeskJet printers, and FIXED FONT 3.

Normally, you will not need a scaling factor; the font is used in its original size. The scaling factor allows the font to be made larger or smaller, and affects the fonts' displays, not the fonts themselves. This means that one font could be used with different scaling factors.

One of the main reasons to use scaling factors is to save space, especially where using large letters in, say, the titles where your computer has 1 MB of RAM; here, you could use the ratio of "2:1" to increase the size of the original font. Where you have enough RAM, do use the fonts in their original sizes to take full advantage of their graphical resolutions.

6.4 Assigning styles to the score editor

The righthand box of the Fonts window is where you assign your different styles to the score editor's automatic text displays:

TRACKNAME STYLE: the track names' style

BAR NUMBER STYLE: the bar numbers' style

CHORD: LARGE STYLE: the chord root letter's style

CHORD: SMALL STYLE: the chord descriptor's style

TUPLETS STYLE: the tuplets numbers' style

TUPLETS ITALIC: tuplet italic display on/off

MULT. REST STYLE: "rests of more than 1 bar" number style

TEMPO STYLE: "quarter note = tempo" number style

PAGE NUMBER STYLE: the font style of the page numbering function

REPEAT ENDING STYLE: font style of the repeat ending number

6.5 Saving/loading the font configurations

Font configurations are saved as part of a "*.SON" file. **When you load a song which has a certain font configuration, the fonts are loaded in the final stages of the song load. NOTATOR compares the current status of the slots with what is required by the song: if they are different, NOTATOR looks for the required font.**

This is very quick when a hard disk is being used. If NOTATOR cannot find a font file on the disk, the "Control Line" will say "Load Error - File not found - hit any key": hitting a key proceeds to the next font. If, at the end of the loading process, font files have not been found, they will be seen as "muted" in the Fonts window: this allows you to see which are missing, so you can load them once you have found out where they are. To do this, simply un-mute the slots, left click one of them, use the File Selector to find your font folder and open it, click "OK", then click the Font Window's "OK" - this refreshes the file path and allows all the remaining fonts to be loaded.

Files will not be found if:

- you are using a different font configuration to the one presently in NOTATOR <u>and</u>
- you are using a different disk drive to the one you used when you loaded the fonts <u>or</u>
- quite simply, the fonts in demand are nowhere to be found.

If you are loading a song whose font configuration is different from the configuration you usually use, and you are not using a hard disk, you must ensure that the font files are all on the song disk if they are to be automatically loaded.

6.6 How to interpret GDOS fonts

The filenames of most GDOS fonts contain the following information:

- The first four letters show the font's name, eg:

ATSS____.FNT	Helvetica (also known as "Swiss"); sans serifs
ATTR____.FNT	Times Roman (also known as "Dutch"); with serifs
ATTP____.FNT	Typewriter (Courier)

- The next two characters show the point size:

____10__.FNT
____12__.FNT
____18__.FNT
____24__.FNT

- The last two characters show the designated output medium for which the font is designed:

______ .FNT	72 DPI (Screen / 9-pin printers)
______SP.FNT	180 DPI (24-pin printers)
______LS.FNT	300 DPI (Laser / DeskJet printers)

All GDOS fonts have the extention "*.FNT".

Examples:

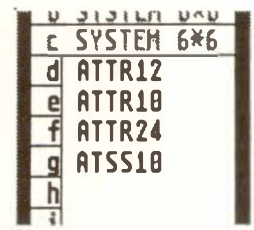
ATSS12.FNT -
Helvetica - 12 point - screen/72 DPI
ATTR24LS.FNT -
Times Roman - 24 point - 300 DPI

6.7 Examples of down-loadable fonts

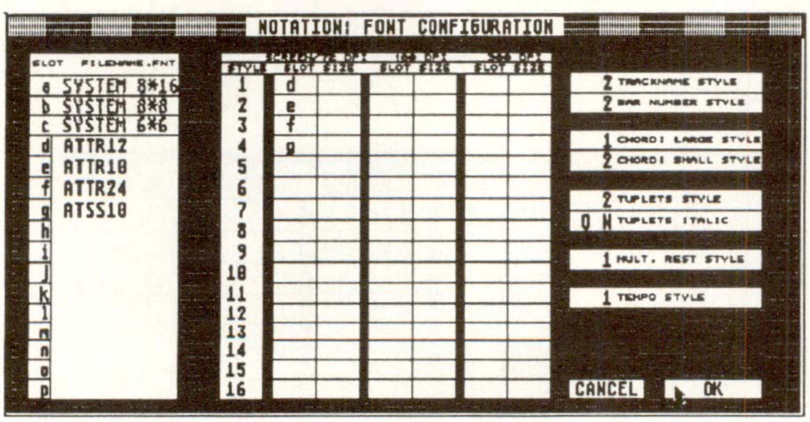
Suppose you wish the following fonts to be used in a song:

1: Lyrics: 12 point Times Roman (ATTR12)
2: Tracknames/bar numbers:
10 point Times Roman (ATTR10)
3: Title: 24 point Times Roman (ATTR24)
4: Fingering: 10 point Helvetica (ATSS10)

First load the fonts from disk into slots d to g.



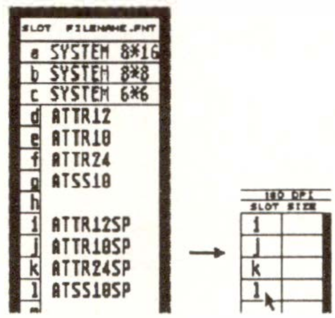
Next, place the slot letters into styles 1 to 4 in the "SCREEN/72 DPI" section. Because we are using the fonts in their original sizes, the "SIZE" column remains empty. Then, in the Fonts window's right-hand box, assign the tracknames/bar numbers etc to the style number containing the desired font letter.



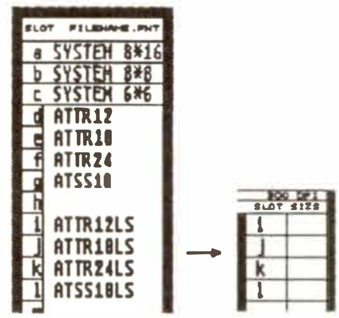
If you have a 9-pin printer, that is all the configuring you need to do, as the screen fonts are the same as the printer driver fonts.

For 24-pin or laser printers, you will need to load the corresponding fonts into further slots, then place the letters of those slots into the styles that correspond to their "screen" counterparts.

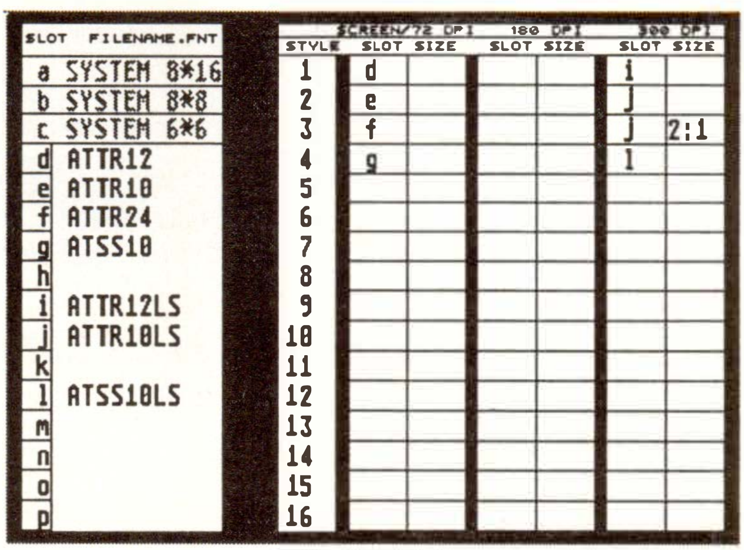
180 DPI:



300 DPI:

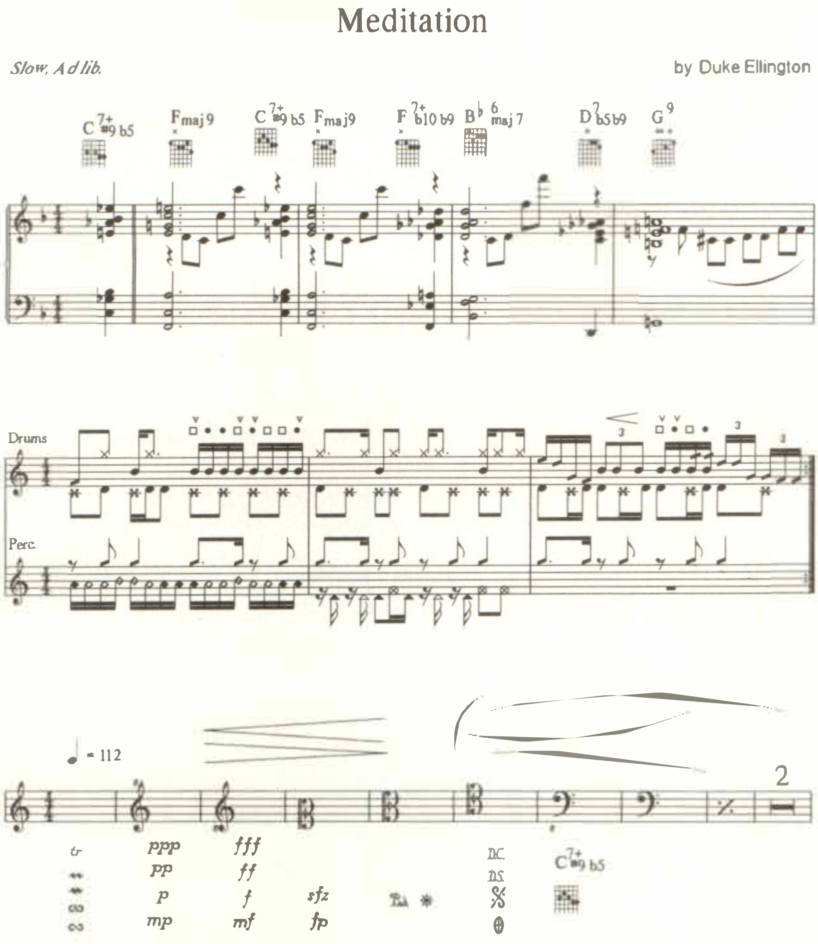


To save RAM, the printer font for the title (ATTR24SP or ATTR24LD) could be replaced by the corresponding 12 point font (ATTR12SP or ATTR12LD) and given a scale factor in the "SIZE" column of 2:1:



14. Score Printout

14. Score Printout

1. The basics

NOTATOR can print your score on a whole range of printers, from simple 9-pin printers to high-resolution laser printers. Printout can take place direct from the score editor. The parameters that govern the printing are in the "Edit" menu's "Printer" window; its "PAGE PREVIEW" switch gives you a window showing a miniaturized printed page.

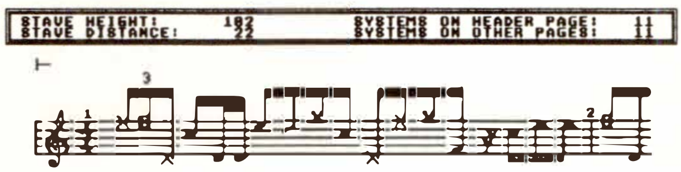
It is always the current track which is printed, unless you are in Full Score mode, in which case the tracks in the current pattern are printed.

Before the printing process can begin, NOTATOR must be adapted to your particular printer. This adaptation need only be conducted once, on acquiring NOTATOR *(see section 7 below)*.

2. Vertical print area

The upper and lower limits of the area which can be printed are represented by small graphical "corner-brackets" above and below the lefthand end of the stave (above top stave, below bottom stave in Full Score mode).

To set the amount of space above the top stave, drag the top stave up or down with the left mouse button. To set the amount of space below the bottom stave, drag the lower printing limit up or down.



While dragging, the Control Line tells you the absolute position of the stave/printing limit being dragged, its position relative to the upper printing limit/stave above it, and the number of systems you could print out per page with the staves/printing limits at their present positions.

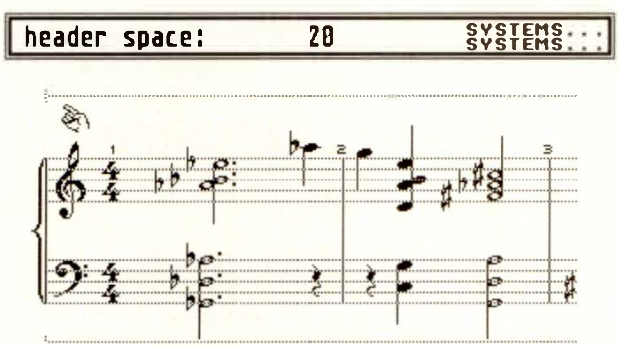
Tip: ensure that everything you want to print is included in the print area. Objects below this limit will not be printed or will be only partially printed.

3. Header

The upper marker represents the upper limit of the normal print area. It is normally on the score editor's upper borderline. Dragging this marker downwards (mouse pointer inside the angle) allows space (which the Control Line calls the "Header Space") to be made for a title, composer's name, copyright owner etc. If "PRINT HEADER" is "ON" in the Printer window, this header information above the marker will be printed on the first page, but not on subsequent pages.

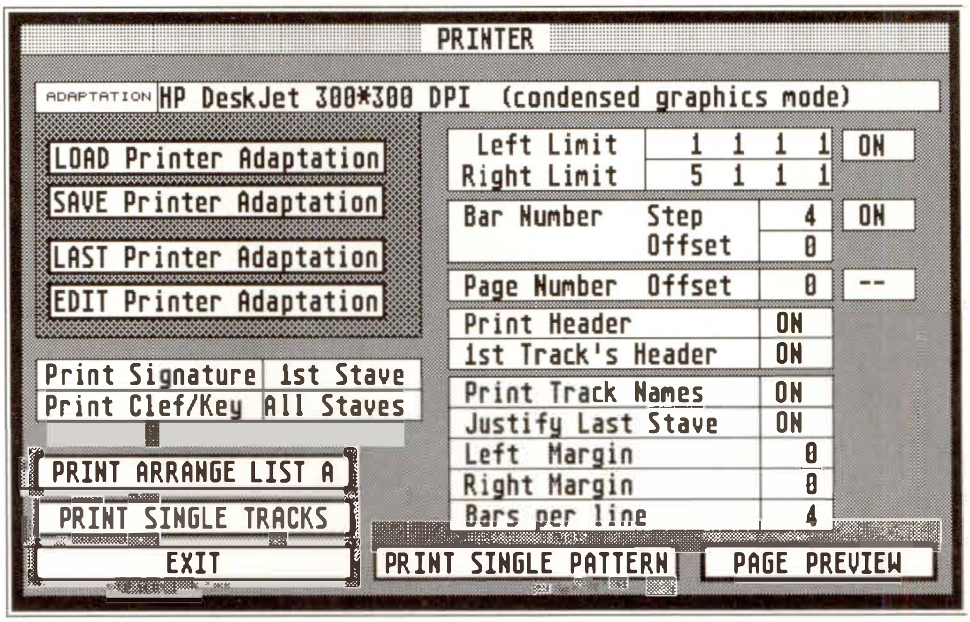
The reason why the Control Line gives two "Systems on… Page" readouts is that the page with the header may be able to fit fewer systems than the subsequent pages.

Tip: ensure that all objects that do not belong to the header are positioned below the upper printing limit.



4. Print parameters

The Printer window has various parameters that control the printer output:



LEFT/RIGHT LIMIT: with the locators "ON", the portion of the score to be printed can be exactly defined. Upbeats can be included by setting eg "LEFT LIMIT: 0 4 1 1".

BAR NUMBER: the bar numbers displayed in the score may be increased by a certain value ("OFFSET"); you can also determine the "STEP" between the numbers. The bar number display can also be switched off altogether.

PAGE NUMBER: produces a page number on print out, positioned at the top centre of each page.

NB: These page numbers are assigned to the top stave, though not to the Header. It is important to leave enough space between the stave and the upper printing limit when you are editing the layout of the staves.

The font style of the page numbering is settable in the Fonts window.

PAGE NUMBER OFFSET: allows an offset to be added onto the page number.

PRINT HEADER: enabled, NOTATOR will print any title, credits etc that appear above the top printing limit in the "Header" on the first page, but not on following pages.

1st TRACK'S HEADER: applies the Header of the top track to all the other tracks when printed out as single parts.

PRINT TRACK NAMES: track names may be removed from the printout.

JUSTIFY LAST STAVE: the last system will fill the entire width of the page.

LEFT/RIGHT MARGIN: lets you set the left and right printing margins, no matter what the current printer adaptation is set to. They can be graphically set in the Page Preview window.

BARS PER LINE: forces all lines to have the same number of bars.

PRINT SIGNATURE, PRINT CLEF/KEY: this determines where the time signature, clef and key signature should be printed in the score.

Both functions have the following options, settable independently:

None: they will not be printed anywhere.

1st Page: top of first page only.

1st Stave: top of each page only.

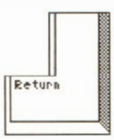
All Staves: each stave.

PRINT SINGLE TRACKS: allows the automatic printing of all single parts of a score, one after the other. The tracks are those you specify in the Display Parameters window. After the end of each part, the printer is automatically instructed to Form Feed, so that each part begins on a fresh page.

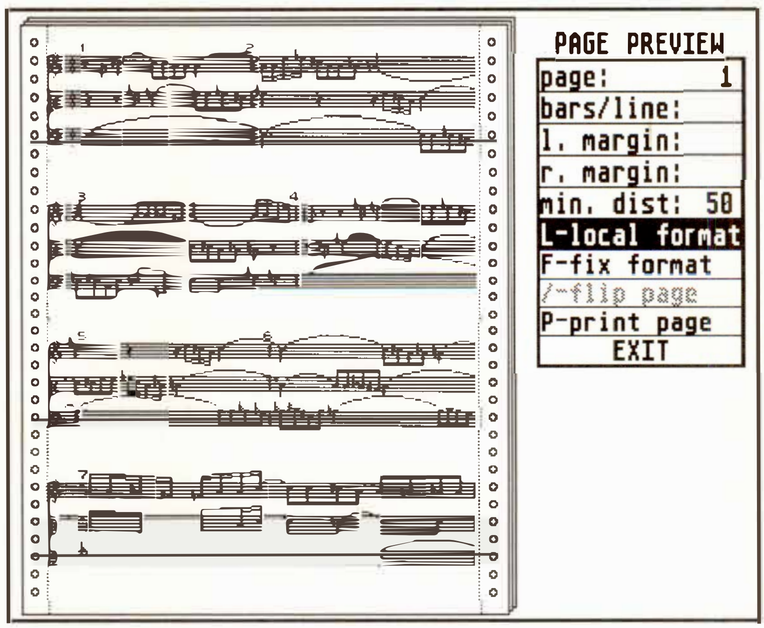
EXIT: quits the window without your having to print something.

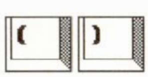
5. Page Preview

5.1 The basics



To enter Page Preview from the score editor, press 'P'; from the Printer window, click "PAGE PREVIEW" or press 'Return'. A miniature version of printed page number one will appear.





You can turn the pages by clicking the "page" number or using the '(' or ')' keys in the calculator keypad.

Via use of the calculator keypad and the Control-slider feature, pages (up to page 99) may be directly accessed. The first time you try to access a non-sequential page number, Page Preview scrolls through each page in turn until the desired page is reached; thereafter, you may jump around from page to page within the scrolled region, so long as the global formatting is not altered (ie clicking in a stave with "local format" disabled).

NB: Directly accessing pages is only available as long as you stay within Page Preview. When quitting and then entering Page Preview again, NOTATOR has to do a new page calculation.

Tip: if you wish to prepare a long piece for printing using Page Preview, set your Printer Limits, edit the global format as required throughout the piece, then tap out "99" in the calculator keypad: this starts the page scrolling process, during which you could be getting on with something else until the computer is ready for you.

The displayed page can be printed by pressing 'P' or clicking "print page". Stop the printing by pressing any key.

The Page Preview display is dependent on the Printer Adaptation in force, so ensure you have loaded the correct one before you start editing in Page Preview.

5.2 Automatic linewrap

How many bars you get per line is automatically decided by NOTATOR. The following factors influence the result:

- The space the notes need
- "MINIMUM DISTANCE" in the Global Score Parameters window
- The "WIDTH" parameter in the printer adaptation
- The "LEFT/RIGHT MARGIN" parameters in the Printer window.

Changes to these factors (eg by loading a different printer adaptation) can therefore change the number of bars you get to a line.

5.3 Fixed number of bars per line

The "bars/line" parameter in Page Preview (same as "BARS PER LINE" in the Printer window) forces all lines to have the same number of bars. No value here allows NOTATOR to automatically decide as usual.

CAUTION: having too high a value here can lead to overlapping notes. The most bars you can get per line without overlapping is obtained by setting the "minimum distance" parameter in the Global Score Parameters window to "1" and leaving NOTATOR's automatic linewrap to decide the exact number.

"Bars/Line" affects the display of all the staves, single or in Full Score mode.

5.4 User-defined number of bars per line

The linewrap can be determined individually for extracted parts and for Full Scores. You can edit the number of bars per line whether they have been previously preset by the "bars/line" parameter, or automatically-determined by NOTATOR.

The number of bars in a line is controlled by special P_USER events which are inserted at the beginning of a line in the event list, whose "second data byte" gives the number of bars in that line. Single tracks use P_USER 84 ("Format Part") and a Full Score uses P_USER 85 ("Format Score"). Format events that do not fall at the beginning of a line are ignored. Editing lines in Page Preview automatically inserts, alters or deletes these format events so that you do not need to edit them directly in the event list, though you may delete them using the easy "Fast Delete" method *(see Chapter 9.19)*.

A left-click in a Page Preview line increases the number of bars per line; a right-click decreases.

L

The "local format" switch ('L' key) determines how the editing will affect the following lines:

- **with "local format" on, only the next line will be affected by any editing of bars per line.**
- **when off, all the following lines will be affected.**

F

"Fix format" ('F' key) fixes the bars/line numbers for the whole current page by inserting the format events at the beginning of each line in the event list.

5.4.1 Left/right margin

The left and right margins may be set, either by dragging the vertical dotted lines either side of the stave display or by entering the values in the relevant box.

5.4.2 Minimum distance

The Minimum Distance factor is settable directly in Page Preview. It determines the minimum distance between notes, and so influences the width of the bars. It is the same function as the one in the Global Score Parameters window.

Minimum Distance is overridden by the formatting in Page Preview, ie clicking in a stave will alter the bars per line that Minimum Distance has offered.

Note that Left/Right Margin and Minimum Distance cannot be edited (they are grey) if that would lead to a line break of the previous page. Editing is always possible on the first page.

Example: if you have reached page 5 after formatting the previous pages, and decide, after all, that you wish to have a different margin width, you must go back and use “Fix Format” on each page 4 to 1 to “freeze” their formatting, then jump back to page 5 and change the margins: this ensures that margin changing will not destroy the earlier formatting. The margin setting applies to the whole piece.

Tip: one way to use the “Bars per Line” function: set bars/line for the first page and use “Fix Format”. Now set bars/line for the second page and fix that; carry on for the other pages.

5.4.3 Flip page

“Flip page” allows you to view the lower portion of the printed page where the printer adaptation is for A3, A2 or similar sizes which cannot fit onto the screen.

5.5 Tips on page formatting

Page formatting should normally be started with "local format" disabled, beginning with page 1. Carry on, one page after another. Changing the number of bars per line in a page which has already been formatted can be done with "local format" enabled, which prevents the formats of subsequent pages from being affected.

Only start page formatting once you have finished all the editing etc that might have an effect on the bar widths *(see section 5.2 above)*. Factors that influence the bar width include:

- the number of notes in a bar (of course!)
- the key, plus any changes in key or clef
- any "graphical microshifting"
- any use of the Lyrics mode (ensure the correct font is being used since this influences the space taken by words).
- Also important, ensure the correct printer adaptation is loaded, since it contains information on the paper format.

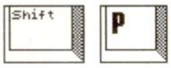
6. Printing

Printing can take place from Page Preview, the Printer window, or direct from the score editor.

Important: ensure that the printer head is lined up with the top of a sheet of paper before printing.

6.1 Printing a pattern

"PRINT SINGLE PATTERN" in the Printer window begins the printing process according to the "LEFT/RIGHT LIMITS".



"QUICK PRINT": pressing 'Shift-P' when in the score editor starts the printing process from the top of the track(s), without any header.

Clicking "print page" in Page Preview or pressing 'P' prints the displayed page, allowing you to individually re-print sides that were altered in some way after a complete printout.

6.2 "PRINT ARRANGE LIST A"

"PRINT ARRANGE LIST A" prints the patterns in chain a of the arrange list one after the other.

NOTATOR does not print the contents of the arrange list as a whole song: to do this you would need to use the "Arrange-to-Pattern Copy" function *(see Chapter 20: "ARRANGE M●DE"),* because NOTATOR's printing is based on the structure of one pattern (or two if you are in "32 tracks/pattern" mode).

There may be a chance that doing a printout of chain A will give you the appearance of a song without any breaks, but it depends on each pattern ending neatly at the end of a line and other factors.

6.3 Aborting the printing

While printing, pressing any key will stop the process.

The printing may continue on for some time depending on the size of the printer's buffer. One way to stop the printer is to switch it off and on again: this empties its buffer. Some printers have a reset switch that has the same effect.

7. Printer adaptations

7.1 The basics

Almost every printer requires its own set of formatted instructions. There is not really any such thing as a standard configuration among printers since each new generation produces a new set of problems.

To cope with this situation, built-in to NOTATOR is the ability to user-define printer drivers to suit the various printers. Virtually without exception, it is possible to configure drivers for all the current printers that support graphics.

These printer "adaptations" can be loaded from and saved to the program disk and edited in NOTATOR's special adaptation editor.

NOTATOR comes with a whole range of printer adaptations in the folder called "PRINTER" on the program disk. The vast majority of 9 and 24-pin printers will run successfully off the adaptations that are provided with NOTATOR: simply work through the list until you find one that suits your printer, then save the adaptation as part of your "AUTOLOAD.SON".

The current adaptation is saved as part of any "*.SON" file. You should ensure that your "AUTOLOAD.SON" includes your printer's adaptation *(see also Chapter 28: "DISK OPERATIONS", section 2.3 "Autoload Song").* Your "AUTOLOAD.SON" should be saved onto your working program disk. If an "AUTOLOAD.SON" song is present on the program disk, it will be auto-loaded with NOTATOR, saving you the trouble of having to load the printer adaptation separately.

Saving the adaptation as part of your "AUTOLOAD.SON" is <u>not</u> done via the "SAVE Printer Adaptation" option in the Printer window *(see section 7.4 below).* **It is done on the main page via "Save Song" in the "File" menu:**

Tip: there is oft confusion amongst newcomers to computers when it comes to recognizing "files" and "folders" in the Atari File Selector window. All users should familiarize themselves with these concepts in their ST manuals, but we include here some help.

We are assuming you have found an adaptation that suits your printer and loaded it into the Printer window via "LOAD PRINTER ADAPTATION".

To get to this printer adaptation file on disk in the first place, you will have had to open the "folder" called "PRINTER" in which are contained all the ready-made adaptations that are provided with the program.

When you come to save the adaptation as part of the "AUTOLOAD.SON", you will need to return to the main NOTATOR page and select "Save Song" in the "File" menu. You may not be aware of the significance of the top "Index" or "Directory" line, which is in all probability telling you that if you were to save now, you would be saving this song back into the printer folder which is still open: this would render the song "invisible" to the program and prevent it from being auto-loaded.

If the Index/Directory line is showing an open folder, such as "A:\PRINTER.SON" (a folder is always shown between two "backslashes"), you must first close this folder to ensure you save the song to the "root directory". To close the folder, click the directory's close box (top left) so that the Index/Directory line shows eg "A:*.SON": now you can save "AUTOLOAD.SON".*

7.2 "LOAD Printer Adaptation"

By clicking "LOAD Printer Adaptation" in the Printer window, you gain access to NOTATOR's range of adaptations for common printers; their filename extension is "*.PRT" (ensure the program disk is in the drive before clicking).

If your particular printer's name cannot be found in the PRINTER folder or in any of its sub-folders, you could try loading one of the existing adaptations – your printer will come to no harm. The worst that can happen is that a load of nonsense will be printed, and that you will use extra paper!

In the unlikely event of none of these adaptations working, you will need to use the data in your printer's manual to edit a file *(see below)*.

7.3 "LAST Printer Adaptation"

By clicking "LAST Printer Adaptation" in the Printer window, you reload the previous adaptation (eg when you have finished working on a friend's song, who has a different printer).

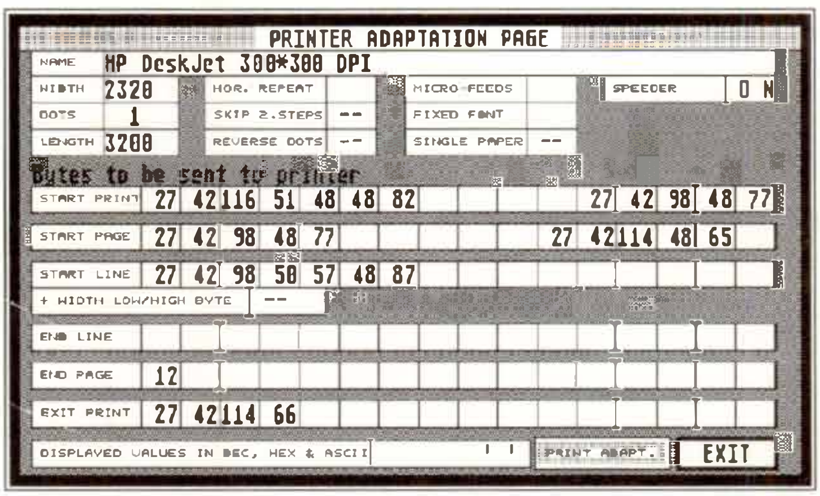
7.4 "SAVE Printer Adaptation"

By clicking "SAVE Printer Adaptation" in the Printer window, you are able to save the current printer adaptation to the PRINTER folder on your program disk.

This is not the same as saving the adaptation as part of the "AUTOLOAD.SON" *(see above);* instead, it is for adding to the printer archive in the PRINTER folder.

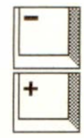
7.5 "EDIT Printer Adaptation"

By clicking "EDIT Printer Adaptation" in the Printer window, you gain access to NOTATOR's adaptation editor, where the codes needed to program a printer are to be found.

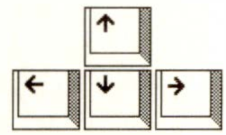


As you will see from your printer manual, you need to be in possession of a fair amount of technical knowledge to be able to understand and operate the necessary adaptation codes. Unlike most other parts of the program, experimentation will probably not get you very far, so if you are in need, try to find an expert.

Luckily, it is very rare to need to use the adaptation editor since most of the adaptations provided with NOTATOR work with almost all dot matrix printers.



Entries are conducted, as everywhere in NOTATOR, via the mouse buttons, the '+' and '-' keys, the cursor keys and direct input from the calculator keypad. At the bottom of the adaptation editor is the translation display that translates any code you click with the mouse into the equivalents in decimal, hexadecimal and ASCII. Also, by clicking the translation display itself, you can convert the whole editor into showing one of the three languages, useful when working with a printer operating manual that does not work in decimal.



Programmable parameters:

NAME: this can be changed at any time – any change of wording does not affect the adaptation itself. The name is visible in the Printer window too. There is room to include other important information such as DIP switch positions.

WIDTH: shows the width of the printout in pixels (screen dots). The maximum (and optimum) value is the width of the paper.

DOTS: the number of pins in the matrix. Choose "8(9)" or "24" depending on whether the printer is an 8/9 or 24-pin matrix. Setting "1" is used for Hewlett Packard and compatible printers. The "LASER" setting is used for the Atari SLM 804 printer *(see next section).*

LENGTH: shows the maximum length of the printout in pixels, which should be set somewhat less than the length of the page. Once this length is reached, NOTATOR sends the "END PAGE" codes, usually a form feed. This prevents any printing over the perforations. With cut paper, not continuous, this value is not so critical, since it is the START PRINT codes that define the length of paper.

HORIZONTAL REPEAT: this instructs the printer to go over the same more than once. If you have set the printer to a higher graphic resolution using START LINE, the combination of both will give a more concentrated (ie "black") result to your notation.

SKIP 2nd BYTE: this instructs the printer not to print every second line; combined with a halving of the print resolution (ie draft quality), this type of adaptation is suited to producing quick test printouts.

REVERSE DOTS: this reverses the order in which the individual pins in the printer's matrix are addressed: this is a very unusual adaptation, required by very few printers.

MICRO FEEDS: some 8/9-pin and 24-pin dot matrix printers support micro feeds and can be made to produce higher-quality printouts. They are able to move the paper on in fractions of the distance between two pins in the dot matrix. The result is an improvement in the printer's graphic resolution, since a line is gone over more than once by the printing head, whilst the paper moves on in tiny increments between each pass, allowing the spaces between the dots on the page to be progressively filled. After the last pass, the paper is moved on by a corresponding number of increments.

The MICRO FEEDS parameter sets out the number of extra micro-lines the printer is to print. To start with, the END LINE sequence must be programmed with the corresponding micro-linefeed codes. A MICRO FEED value of 1 requires the paper to be moved on by just one half of the distance between the dots. A value of 2 corresponds to a linefeed of one third of the distance. The offset between two pins in an 8-dot matrix printing head is normally 1/72 inches, so where the MICRO FEED value is 1, the linefeed must amount to 1/144 inches (a value of 2 is equivalent to 1/216 inches). The graphic resolution (START LINE) has to be set to ensure that the micro-linefeed and horizontal dot offset agree as far as possible. Unfortunately, not all 8 pin printers support the necessary micro feed codes, which would allow these printers to emulate the output of a 24 pin printer.

Please note: since the vertical resolution of the graphic result using MICRO FEED is multiplied by a certain factor, the LENGTH value will also need to be given the same multiplication factor.

A micro feeding printer can make use of the higher resolution fonts *(see above)*.

SINGLE PAPER: this option makes the printer wait for a key command each time the end of a page is reached to allow you to insert a new sheet.

FIXED FONT: NOTATOR has a range of fonts of different sizes for use with printers of differing resolutions. These are normally automatically selected according to the printer's pin resolution and the MICRO FEEDS setting. With FIXED FONT you can override this process to print eg very large or very small notes.

Some laser accessories, for instance, emulate an 8-pin printer, but with a very high density of 300 DPI. Here, you would set PINS to 8(9) and FIXED FONT to 3 to select the appropriate font.

SPEEDER: this switch increases the data transmission speed to the printer, and should basically be left in its enabled state.

Occasionally, where programs such as accessories or other resident programs are used which themselves have access to the printout, SPEEDER will need to be switched off (for example, laser printer driver accessories, printer spoolers). In rare cases, the transmission speed may be too great for the printer being used, but this can easily be checked by switching off SPEEDER and printing again.

There follows an explanation of the codes used in the box called "Bytes to be sent to printer"; empty positions are not sent.

START PRINT: these figures are sent once only at the beginning of the printing process. Any necessary initialization processes can be undertaken here.

With MICRO FEEDS disabled, the size of the line feed must be such that two lines that follow each other must abut exactly.

START PAGE: these codes are sent at the beginning of a new sheet. It may be necessary to enter more linefeed commands ("10").

START LINE: these codes are sent at the beginning of each line of print. This is where the printer is instructed to enter its graphic mode.

Most printers are able to offer different graphic modes with various resolutions of width. The width resolution should roughly correspond to the height resolution, to retain the proportions of the notes. With HORIZONTAL REPEAT or MICRO FEEDS enabled, the graphic resolution must be correspondingly multiplied (see above). An enabling of SKIP 2nd BYTE requires the graphic resolution to be halved. If the graphic mode is set too high, the display will look compressed; if too low, the display will look too spread out. "WIDTH" should be set to an optimum figure so as to use the maximum width of the paper.

+ WIDTH LOW/HIGH BYTE: this is where almost without exception, the number of graphic dots per line must be sent as low/high byte values as seen in WIDTH above. In this case "+ WIDTH LOW/ HIGH BYTE" should be enabled, whereupon NOTATOR will automatically calculate these two figures and send them. You need only change the WIDTH value if required.

If "1" is the value in the "DOTS" box, the lines will be sent compressed if + WIDTH LOW/HIGH BYTE is on, which corresponds to the Hewlett-Packard graphic format "1". In this case the whole START LINE sequence of a line will be automatically calculated, according to the graphic data. Caution: not all HP-compatible printers support this compressed format!

END LINE: these codes are sent at the end of a line. Normally they are set to 13 (carriage return) and 10 (linefeed) but if your printer is in an "Auto Line Feed" mode, the "10" should be removed.

If MICRO FEEDS is enabled, NOTATOR will expect to receive a command to commence a single micro-linefeed instead of a normal linefeed. Once a line of notation has been printed, the printer will automatically advance by the corresponding number of micro-linefeeds to the beginning of the next line of notation to be printed.

END PAGE: these codes are sent at the end of a page *(see LENGTH)*. Normally the code is set to 12 (form feed). Where possible the page length should be sent in START PRINT since the printer's default setting may not conform to the standard DIN A4 page size.

EXIT PRINT: these codes are sent once at the end of the printing operation, and can include commands such as Printer Reset, to initialize the printer for word processing, for example.

7.6 Atari SLM 804 laser printer

An important consideration when choosing a laser printer is the fact that the Atari laser requires, for its own uses, 1 Megabyte of the computer's RAM to operate, so it can only be run with an ST computer of 2 Mb RAM or more. The alternative is to run the Hewlett-Packard LaserJet or DeskJet printers (the DeskJet is a cost-effective high-resolution inkjet printer) which will run with a 1 Mb computer. Most people, though, opt for a 24 pin or 9 pin dot matrix printer.

If you own the Atari SLM 804 laser printer, you must ensure that if it is connected to the computer, it is powered-up and remains on for the duration.

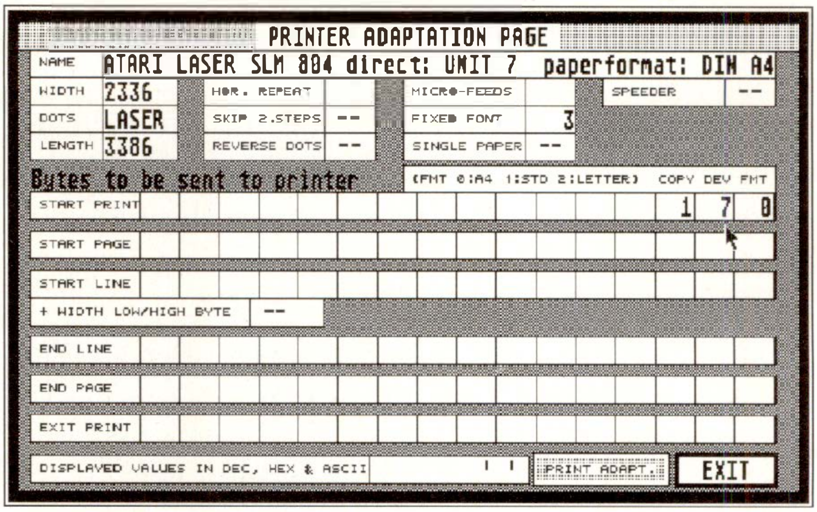
Otherwise you run the risk of corrupting and so losing the files that you save to disk. This applies to any Atari-compatible program that uses this laser printer. If the printer's fan noise annoys, either refrain from connecting it in the first place, or use the following (unofficial) method:

To stop the fan noise for a time, prop open the flap at the back with something such as an eraser; the electronics will remain active.

The printer will not overheat at normal ambient temperatures. Ensure nothing can get into the gap (insects, dust) by covering with a cloth.

Important! Never disconnect any of the cables while the SLM 804 or computer are powered up. If the printer appears not to print with NOTATOR, the probability is that it is set to a different "device number" from that set in NOTATOR's SLM 804 printer adaptation. Simply change the "DEV" (for device) value in NOTATOR's printer adaptation window *(see below)* until the printout is successful. Or, you may alter the device number within the printer's little Control box to match NOTATOR's (usually "7").

The transfer of data to the SLM 804 is conducted via the DMA ("Direct Memory Port" or hard disk) port, not the usual printer port. The printer uses about 1 Megabyte of the computer's RAM, so you will need to be using an Atari with at least 2 MB RAM. SOFT LINK partition 1 needs to be set to at least 2000 kB.



None of the printer adaptation editor window's codes affect the SLM 804: you need only to set the "DOTS" box to "LASER".

The last positions in START PRINT are useful, however:

COPY: number of copies of each sheet.
DEV: the Device Number. This must match the printer's Device Number which is preset in the control box attached to the printer by the umbilical cord. If the printer refuses to work, change this number, each time attempting a printout until it starts.
FMT: paper format: 0: DIN A4
1: US Legal Size
2: US Letter Size

(the WIDTH and LENGTH parameters are ignored).

Do read the printer manual very carefully.

7.7 Printout of the printer adaptation

PRINT ADAPT.

The "PRINT ADAPTATION" switch makes your printer print the printer adaptation codes as seen in the editor window.

7.8 Tips on printer adaptations

Parameters MICRO FEEDS, REPEAT, SKIP 2nd BYTE and REVERSE DOTS should initially be disabled when editing an adaptation for a new printer.

If the printer prints nonsense, without any recognizable notation, the problem probably lies in the fact that the printer has not switched over to its graphic mode – see START LINE.

If notation can be recognized, but is mixed in with nonsense, the problem could lie with the number of graphic signs being sent via START LINE; alternatively, the "DOTS" value is wrongly set.

If every line of graphic notation is broken up by a blank line, you may find it necessary to remove the 10 from END LINE. Alternatively, the size of the line-feed in START PRINT may be wrong.

If the printer prints over the perforations of the paper, and appears to be drifting more and more, the correct page length must be set in START PRINT.

7.9 Which printer?

NOTATOR is compatible with virtually all known printers that support graphics, thanks to its unique adaptation editor. The quality of printout is very much dependent on the printer being used, and here, the ultimate deciding factor is the printer's graphic resolution, which is normally given in dots per square inch (DPI).

9-pin printers eg STAR LC 10: these are low-price, low (72 DPI) resolution printers. Some will support the MICRO FEEDS function to improve quality.

24-pin printers eg NEC P6: these are in general use and can represent good value for money, with a resolution of 180 DPI. MICRO FEEDS can theoretically double this resolution in some printers, but the result is not the same as from a laser or inkjet printer.

Laser printer Atari SLM 804: this printer does not have its own buffer, which means that you will need at least a 2 MB ST to run it. The print quality is appreciably higher than that of a 24-pin printer due to a resolution of 300 DPI, and its speed of operation is higher, too. It is, however, expensive to buy, and running costs have to be taken into account.

Laser printer Hewlett Packard LaserJet 2: excellent-quality printer; needs no outside buffer.

Hewlett-Packard DeskJet Plus: the print quality equals that of the laser printer, with a resolution of 300 DPI. It is compatible with 1 MB ST's such as the 1040 ST. It is appreciably cheaper than a laser, both to buy and to run.

Other points to bear in mind when choosing a printer:

- One very important consideration is paper size. Many Full Scores will not fit on a sheet of A4 paper. There are printers which can work with wide sheets of paper such as DIN A3 portrait (same width as DIN A4 landscape), or even DIN A2 portrait for sheer luxury of space! NOTATOR will support these printers, since they are all dot matrix printers (there is no such thing as a wide-carriage laser!). The adaptations for these wide-carriage printers (eg NEC P7) tend all to be NEC P6 compatible, and all you need to do is alter the WIDTH and LENGTH settings to use the new size (eg WIDTH 1980, length 2880).
  Many people find the flexibility of a wide-carriage 24-pin printer outweighs the resolution of a laser, and don't forget, you can also use a photocopier to reduce an A3 sheet to A4 or A2 to A3 for added resolution.
- quality of the paper transport. Notation requires a good quality mechanical transport to avoid spurious graphic faults.
- speed of printing.
- noise.
- price and availability of spare parts.
- compatibility. It makes sense to choose a printer known to be compatible with NOTATOR.
  If you own a NEC P6 or compatible 24-pin dot matrix printer, you are fortunate, in that NOTATOR defaults to this adaptation if no alternative adaptation is present in the "AUTOLOAD. SON".

9. IMG export of printer output

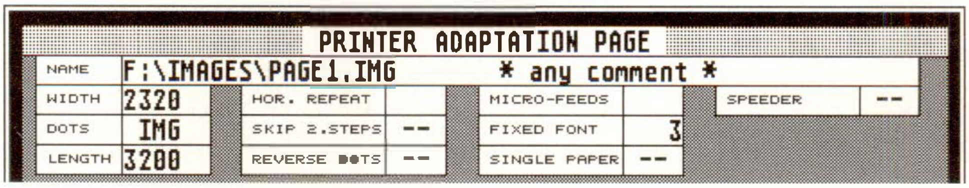
9.1 The basics

NOTATOR's print output can be exported in the form of IMG image files for direct importation into Desktop Publishing Programs (DTPs) and the like. This allows the use of the highest (300 DPI) resolution. This ability opens all sorts of possibilities in layouting and book publishing. Printed pages are saved as files with the ".IMG" extension (use a hard disk if possible). The IMG operation is almost the same as for normal printing, with a new printer adaptation.

9.2 IMG printer adaptation

To help you understand the structure of an IMG printer adaptation, here is a practical example:

- Click the "EDIT Printer Adaptation" button in the "Printer" window (menu "Edit").
- Delete every number, and the name, in the Printer Adaptation, and look at the following picture.



- "Fixed Font" selects the resolution: "1" corresponds to 9-pin dot matrix printers, "2" to 24-pin printers; usually, though, you would use the highest resolution "3" as it corresponds to the output of a laser printer (300 DPI).

- "Length" und "Width" select the page format. These should be set to the size of the image that you wish to import into your DTP/Graphic software. "Width" should be divisible by 8. Check the page size by using Page Preview.

- Under "Dots" select "IMG". This ensures that the print output is "diverted" in the form of an image file onto floppy or hard disk.

- The path (and any additional comment) must be manually entered in the Adaptation title line. The example F:\IMAGES\PAGE1.IMG means that the data will be stored in partition F of the hard disk, in the IMAGES folder, in the form of a file called PAGE1.IMG.

- Now exit the Printer Adaptation window.

9.3 File export

The "print out" of a page may be started with "Print Single Pattern" or via Page Preview. It often makes sense to use Page Preview since pages can be targetted. As usual, the screen fills with the magnified display of the printing process; pressing any key aborts the process.

To export several pages, you must change the file name each time using the Printer Adaptation title line, eg PAGE2, PAGE3 etc. The IMG files so-created can now be used in DTP programs such as Calamus or in text editors such as 1st Word Plus.

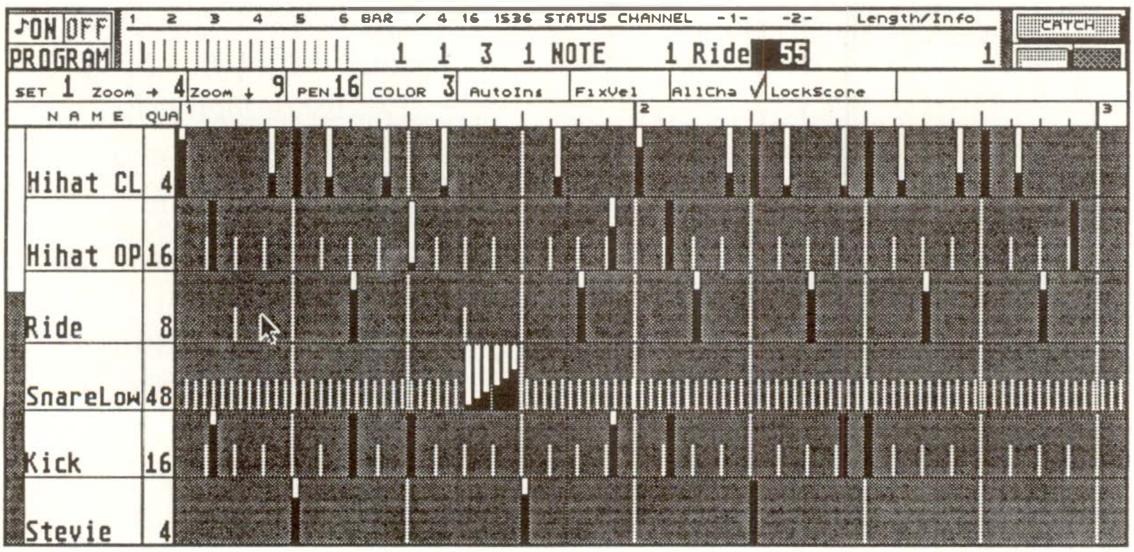
15. HyperEdit

15. Hyper Edit

1. Introduction

Hyper Edit has a huge variety of functions, ranging from the creating and editing of percussion tracks, to the graphical drawing of event values on the screen with the mouse for controlling, say, MIDI Volume. Hyper Edit makes it very easy to edit one particular type of event within a track even if it is mixed in amongst other events.

Whilst the score editor and the matrix editor are really designed to display notes' pitches and positions, Hyper Edit can be configured to single out particular events (such as a particular note or a particular MIDI Controller) and graphically display those events' positions together with their values (such as Velocity or Controller amount).



There are eight "Sets", each containing up to 16 "Instruments".

A Hyper Edit "Instrument" shows the data values of a specific type of event in the form of vertical beams, with time being shown along the horizontal axis.

You can assign any note or any other MIDI event or Pseudo ("P_USER") event to an "**Instrument**". As a rule, an "**Instrument**" will be set to single out a specific value within the event's "first data byte" (eg pitch C4). Alternatively, it could display all the values of the "first data byte", such as all the notes on MIDI Channel 5.

If you use all eight Sets, a total of 128 MIDI events (including Pseudo events) can be singled out by the Instruments.

As soon as you have defined a Hyper Instrument, the selected events will be shown on a grid in the form of vertical beams, looking rather like miniature "faders". The beams show where the events are time-wise, and their vertical heights represent the value, normally of the "second data byte" (eg in the case of notes, their Velocity). By dragging the beam up and down using the mouse, you can easily change the value. The width of the beam is set by "PEN" in the Set parameters.

How much of an instrument you see horizontally and vertically on the screen is determined by the two "Zoom" parameters.

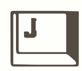
Hyper Edit allows you to add, delete and copy events. It also contains special conversion functions **(Convert, Set Conversion, Do Groove, Do Hihat)** which make it possible to change the meaning of Sets, Instruments and much more.

The whole of event editor, minus the matrix editor (event list, score editor and Hyper Edit) is active at the same time. Editing one part of the event editor will directly affect the display of all the other parts.

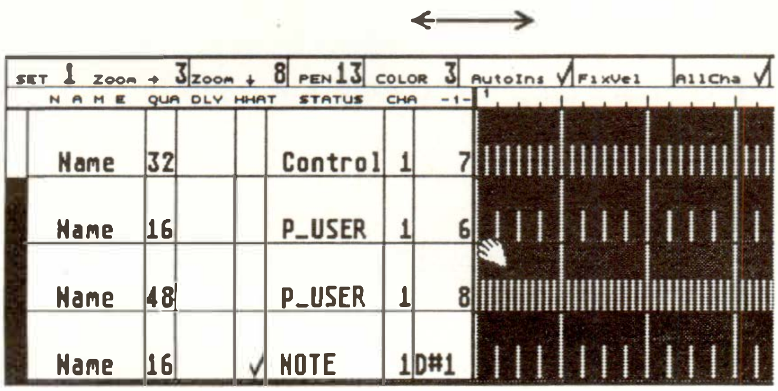
Points to bear in mind while learning:

- *There are two basic ways to use Hyper Edit: as a tool for the creation of music (especially drum tracks, Control events etc); and as a tool for the analyzing of a track's contents.*
- *You must define an Instrument before it will display the desired type of event. The event will be displayed when its "STATUS" and "first data byte" are matched by the Instrument; a further condition can be that the Instrument must match the event's Channel (if "AllCha" is disabled in the Set parameters).*
- *Hyper Edit is always showing the contents of one track, not several tracks, but because you are able to view each note pitch etc in a separate Instrument, it is as if you were viewing more than one track.*

2. Switching on; choosing amount of display

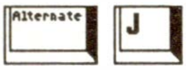


Press 'J' to activate Hyper Edit within the event editor. Alternatively, click "Hyper Display" in the "Edit" menu.



Change the size of the window by dragging the top horizontal dividing line (and/or the bottom horizontal line in NOTATOR).

Enter the settings you require in the Instrument parameters on the lefthand side. These parameters can then be covered by the editor itself, with only the Instrument's name remaining visible.

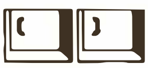


To change the ratio between the parameter area and the Hyper Edit grid, simply use the mouse to drag the vertical dividing line left or right. Press 'Alternate-J' to toggle between the last ratio you selected and the maximum possible size of the parameter area.

You can also select the vertical window within Hyper Edit by dragging the "scroll box" up and down the lefthand edge of the screen within the "scroll bar". If you click inside this speckled scroll bar, Hyper Edit will jump to the next page.

Tip: "MIDI Out" in the "Edit" menu or pressing 'Shift-O' will switch the MIDI output on and off in Hyper Edit as well.

3. Time positioning

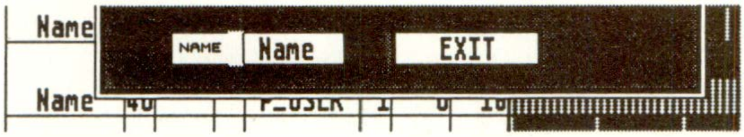


All the positioning operations in the event editor also apply to Hyper edit. Moving in time bar-by-bar can be done using the '(' and ')' keys in the calculator keypad.

4. Defining Hyper Instruments

These are the Instrument parameters:

- **NAME (Instrument name):** right-click where the Instrument says "name" to open its Functions window.



You may type in the new name directly (use 'Esc' first to clear the naming line). The name is purely for your information and serves no other function. The Functions window provides further copy and conversion functions *(see section 9 "Special Hyper Edit functions").*

- **QUA (Quantization):** the value corresponds to the MIDI quantization of the track. Here, however, it determines the resolution of the time grid in which new data can be <u>entered:</u> the grid visually changes according to the current quantization, making it easier to have an overview of what is going on and to locate specific time positions.
  Note: Changing the "QUA" value does not quantize events that are already in the track, only events that you manually enter with the mouse.
- **DLY (event delay/advance):** this parameter, expressed in clock "pulses", has a similar function to the "DELAY" track parameter on the main page, with this important difference: instead of moving <u>the whole track</u> "later" or "earlier", Hyper delay affects <u>only that Instrument.</u> Hyper delay alters an Instrument's event time positions, and the result will be seen in the event list. Any new data you add will already be delayed/advanced by the amount selected.
  The "Delay in ms" option also relates to the "DLY" value.

Tip: "DLY" is the only Hyper Edit parameter which will alter existing data if you use it. Because of this, your clicking must be a little slower to allow the program to alter the data: try using "mouse-as-slider" or the 'Control' + mouse feature for speed.

"Quick Increment": if you click in the "DLY" box about a centimetre from the right edge, the values will jump in musical fractions (1/96th, 1/64th etc) for quick changes.

- **HHAT ("Hihat mode"):** for notes that you enter with the mouse into Hyper Edit: if you tick two (or more) neighbouring Hyper Instruments, this creates a "mutual exclusivity" within this group of Instruments on the same beat. It stops Instruments in a "HHAT" group being active at the same time. For example, if you enter an open hihat at particular time position, any closed hihat which may be there already will be deleted.

  Note: "HHAT" groups within a Set can include as many Instruments as you like (max 16). More than one "HHAT" group can be defined for each Set: to keep these separate, there needs to be at least one Instrument between two groups without a HHAT tick.

The following three Instrument parameters are the ones that actually do the work of determining what events in the track the Instrument will display. An event has to fulfill all the conditions set in these parameters to be displayed ("CHA" excepted - see below):

STATUS: select the status of event that the Instrument is to display. Any MIDI or P_USER status can be selected here. If you select "*undef*", then it is neutral or "undefined" *(see below)*.

CHA (MIDI Channel): select the MIDI Channel of the events that the Instrument is to display. Any of the 16 Channels can be selected here. If "AllCha" is ticked in the Set parameters, this Channel value will be ignored and will not be treated as a condition of display.

-1- ("first data byte"): select the "first data byte" of the events that the Instrument is to display. For example, where the status is a note, its pitch will be defined here; for a Control event, the Control number, and so on. If you select "ALL", the Instrument will display all notes irrespective of their pitch, all Controllers irrespective of their number etc.

With "Control" status, value "1" represents modulation data, value "7" for Volume changes, and so on.

With "normal" Aftertouch ("C-Press"), Program Changes and Pitchbend data, this "-1-" parameter serves no function.

Where the status is a P_USER event, you can select the P_USER number; for example, P_USER 1 allows you to display/create tempo variations.

(For details of what constitutes a "first data byte" etc, see Chapters 8: "TYPES OF EVENT" and 9: "EVENT EDITOR").

- **LEN (defined note length):** this dictates the length of a note if you enter the note manually with the mouse into the Instrument; it is expressed in clock "pulses". Set this to a value such as 16, but not 0 or 1: this optimises MIDI timing and avoids having a Note On and Note Off message being sent at almost the same time.

4.1 Automatic definition of Instruments

To define an Instrument automatically:

- **Make sure at least one Hyper Instrument is undefined (Status "*undef*")**
- **Click the desired event in the event list**
- **Press 'Shift-J'.**
- **Alternatively drag the event from the event list and drop it on top of the undefined Hyper Instrument.**

This transfers the parameter values of the current event into the parameter line of the first undefined Instrument. The cursor will then jump to the next event in the list. If there are related events (eg the different notes of a drum machine) one after the other in the event list, you can quickly define these different events as Instruments simply by repeatedly pressing 'Shift-J'.

For example:

- Put CREATOR/NOTATOR into record mode and record, say, 16 percussion sounds.
- Activate an unused Hyper Set (eg Set 8) in the event editor.
- Ensure all the "STATUS" parameters contain the word "*undef*".
- Jump to the beginning of the event list (press 'Clr Home').

- Keep pressing 'Shift-J' until you reach the end of the list. The notes in the event editor will now automatically be transferred into the Instrument parameters.
- You should name the different Hyper Instruments straight away: right-click in the "NAME" column and enter a name (eg "Snare") in the Functions window which appears.

Note: CREATOR/NOTATOR will make sure that no Instruments are defined more than once. If you do try to define the same event as an Instrument more than once, you will get the message: **"This Event is defined as Instrument"**. This will also happen if you have reached the end of the event list and defined the last event more than once.

If you press 'Shift-J' without having any "undefined" Instruments in the current Set, you will get the message: **"Please mark any instrument as undefined"**.

5. Editing events

You can change the values of existing events in the Hyper Edit grid by dragging the beams vertically with the left mouse button.

If "AutoIns" (Auto Insert) is switched on, events will automatically be entered if you left-click individual empty spaces in the Hyper Edit grid or move the mouse horizontally keeping the left mouse button pressed.

If "AutoIns" is switched off, events will only be entered if you hold the 'Shift' key at the same time as clicking.

With "AutoIns" switched off, you can still change the value of the events (the height of the beams), but cannot enter new ones.

Be careful where you click the mouse button if you have "AutoIns" switched on.

To delete events, click the beams with the right-hand mouse button.

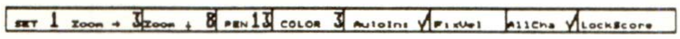
Inserting and deleting can be carried out with a "wiping" motion to the left or right, keeping the mouse button pressed. The distances between the data as it is entered is defined by the Instrument's quantization. You can change the quantization at will within an Instrument to produce different "event densities" for different sections of the music.

6. Global Set parameters

The Set parameters are immediately underneath the dividing line between the event list and Hyper Edit: they contain parameters that apply globally to a whole Set.

These Set parameters are separately programmable for each Set, and can be changed at any time.

The current Set number is specified under "SET".



6.1 Horizontal and vertical zoom

Immediately next to the Set number, you will see two "Zoom" parameters, one with an arrow pointing to the right, one with an arrow pointing downwards.

The horizontal zoom determines the number of bars visible on the screen at the same time.

The vertical zoom determines the number of Hyper Instruments visible at one time. This obviously also depends on the size of the Hyper Edit window you have selected.

The size of Instruments is automatically selected so that Instruments are always fully visible.

Note: not all 16 Hyper Instruments can be shown on the screen at the same time. Use the scroll bar on the left of the screen to reveal the areas you want to be visible. If you click in the grey speckled "scroll bar" above or below the white "scroll box", Hyper Edit will jump in the appropriate direction to the next "page" of Instruments.

6.2 "PEN" and "COLOR"

"PEN" defines the width of the graphical beams used to display the individual events (value: 1 to 16).

The exact time position of an event is represented by the lefthand edge of the beam.

The beam widens to the right to a greater or lesser extent, depending on the "PEN" value. A wider beam is easier to manipulate.

The "COLOR" parameter determines the colour and shape of the Hyper Edit beam and the background:

Color 1: white background. Height of black beam depends on second data value.
Color 2: white background. Black beam varies in height, with the remaining area at the top of the beam being grey.
Color 3: grey background. Black beam varies in height, with the remaining area at the top of the beam being white.
Color 4: grey background. Black beam varies in height.

If you use Hyper Edit as a drum editor, "COLOR 3" is recommended to emphasize the individual events, whilst "COLOR 1" helps to enhance continuous Controllers such as Volume.

6.3 "Auto Insert"

When "**AutoIns**" is switched on, a left-click enters data.

If you move the mouse keeping the right button pressed, current data will be deleted irrespective of the mode you are in.

6.4 "Fixed Velocity"

If "**FixVel**" is switched on, you can insert notes with a fixed velocity value. The default velocity is that of the last velocity you edited in the event list or in Hyper Edit.

If "AutoIns" mode is switched off and you move the mouse over note beams keeping the left mouse button pressed, notes in that area will be given the same fixed velocity.

6.5 "All Channels"

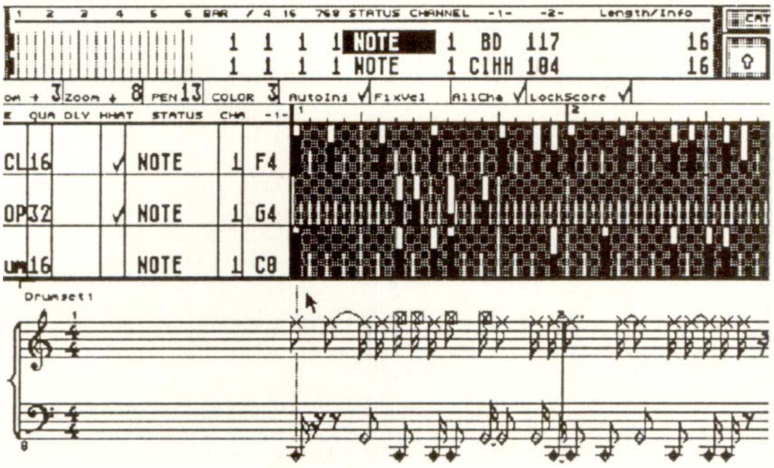
An Instrument only displays the events that match the Instrument's "STATUS" and "-1-" parameters. You can go further than this:

"AllCha" decides whether an Instrument should display all those events regardless of their Channels ("AllCha" on), or only events whose Channel matches the value entered in the "CHA" parameter column ("AllCha" off).

(For those in the know, you could compare this with a sort of "visual" version of the MIDI modes "Omni On" and "Omni Off".)

6.6 "Lock Score"

Switching on "Lock Score" forces NOTATOR to "synchronize" its score editor visually to Hyper Edit, bar-to-bar.



This makes it easier to edit the dynamics and at the same time see where you are in the music.

Note: "Lock Score" mode overrides NOTATOR's automatic display formatting: the score editor display format will be based on the horizontal zoom. This makes it possible to have "nonsensical" settings of the horizontal zoom such as squeezing 20 sixteenth notes into half a centimetre!

7. Mouse/ keyboard combinations

To avoid constantly having to switch "AutoIns" mode on and off and to carry out special functions, there are combinations of the mouse and the computer keyboard.

With "AutoIns" mode switched OFF, the following options are available:

7.1 "Insert"

Left mouse button plus 'Shift' key: this is the same as having "AutoIns" mode switched on; events are automatically inserted in empty spaces. Existing events' values can be changed.

7.2 "Additional insert"

Left mouse button plus 'Alternate' key: data is inserted in spaces where there are no events. The values of existing events <u>cannot</u> be changed.

Note: after insertion, events become "old events": you cannot subsequently change their value while 'Alternate' is pressed.

7.3 "Delete on quantize positions"

Right mouse button plus 'Alternate' key: only those events which are exactly on the Instrument's quantize steps are deleted.

For example: where there are sixteenths in a track, then if you have set 1/8 quantization, only the first of each pair of sixteenths will be deleted, creating 1/16th syncopations.

7.4 Global in/decrease

Mouse plus "Control" key: if you keep the 'Control' key pressed, the value of all the selected Instrument's events can be increased or decreased together by moving the mouse forwards or backwards (do not click!); events outside the display area will also be changed.

It is enough just to point inside an Instrument's area and press 'Control': no clicking is necessary.

Note: changes are limited to a maximum of 127 and a minimum of 0 or 1. Any changes exceeding these limits are therefore not fully reversible.

8. Examples of Hyper Edit

8.1. Editing a track's velocity

Record a piano track using a velocity-sensitive sound and define an Instrument as follows:

NAME:	Velocity
QUA:	16
DLY:	0
HHAT:	---
STATUS:	NOTE
CHA:	1
-1-:	ALL
LEN:	16

Make sure "AllCha" is active in the Set parameters and "FixVel" and "AutoIns" are switched off. If you have NOTATOR, switch on "Lock Score". Try out different "PEN" and "COLOR" settings.

After you have chosen the zoom settings, use the mouse to "paint" the dynamics on the existing events.

8.2 Generating and editing non-note events

The following example uses MIDI Control 7 which controls MIDI Volume.

Play a track with long chords. In Hyper Edit, define an Instrument as follows:

NAME:	Volume
QUA:	96
DLY:	0
HHAT:	---
STATUS:	Control
CHA:	1 (or the Channel of the synth's track)
-1-:	7 (Control 7, MIDI Volume)
LEN:	(irrelevant)

Although it is logical to display MIDI notes as individual, separate beams, a continuous curve or "waveform" is more suitable for displaying continuous non-note operations. You should therefore use the following settings in the "Set information bar":

Horiz Zoom:	7
Verti Zoom:	18
Color:	3
Pen:	16
FixVel:	Inactive
AllCha:	Inactive
AutoIns:	Active
LockScore:	Inactive

If you draw a volume curve (keeping the left mouse button pressed), this will appear black and unbroken against the white background.

Tip: in practize, it is rarely necessary to use a "QUA" value of "96" for these non-note events, though the end result looks prettier! It is normally enough to enter Volume etc changes at 1/16ths or 1/32nds intervals. Of course, once the desired volume has been reached, do not continue entering events, since the last event remains in force until a new one is entered (that's the whole principle of MIDI!). Do not be over-generous with non-note events - they use up memory.

8.3 Hyper Edit as a "drum editor"

The following example shows the quick way to define a Hyper Set in order to edit an existing drum track.

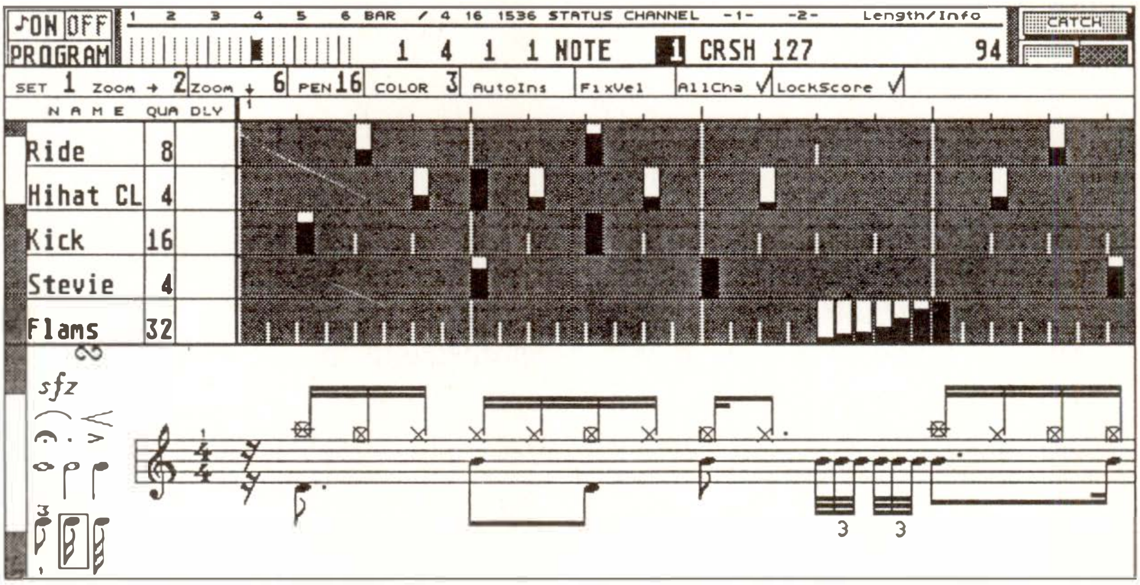
- To use Hyper Edit efficiently, you need to end up with all the drum notes in one track. If you normally record your drum sounds on different tracks, merge them together to one track. Suppose you have a track containing a kickdrum, snare, closed hihat, open hihat, crash and toms 1, 2, 3.
- Enter this track's event editor and select a free Hyper Set whose Instruments are still "undefined".
- Find a closed hihat event in the event list. Holding it by the name "NOTE", drag the event downwards and drop it anywhere onto the first Instrument (alternatively, press 'Shift-J'). The first Hyper Instrument is now defined and should be named (right-click in the "NAME" column).

- Do the same with the remaining notes and Instruments, using, for example, the following order:

Closed hihat:	Instrument line 1
Open hihat:	Instrument line 2
Crash:	Instrument line 3
Kickdrum:	Instrument line 4
Snare:	Instrument line 5
Toms 1-3:	Instrument lines 6-8

- Make a "HHAT" group for the two hihats and crash (tick the "HHAT" column in all three Instruments). This ensures that only one of these Instruments plays at any one time when notes are mouse-entered.
- Make a "HHAT" group for the three toms.
- For each instrument, give the desired grid quantization value in the "QUA" column, in case you wish to add notes with the mouse.

Tip: in NOTATOR, combining a drum-editing Hyper Set with the "Drum Mapping" function for the score makes editing even easier: switch the Hyper Set's "Lock Score" on (see Chapter 11: "SCORE DISPLAY", section 26 "Percussion notation").



9. Special Hyper Edit functions

9.1 Copying an Instrument's data

One Instrument's events can be copied to another Instrument, for example to double a snaredrum with a handclap.

To do this, drag the "source Instrument" on top of the "destination Instrument" with the left mouse button, dragging by the name area (similar to copying a track on the main page).

This will copy the events only: their pitch, Channel and even status will be changed to conform to the receiving Instrument's parameters.

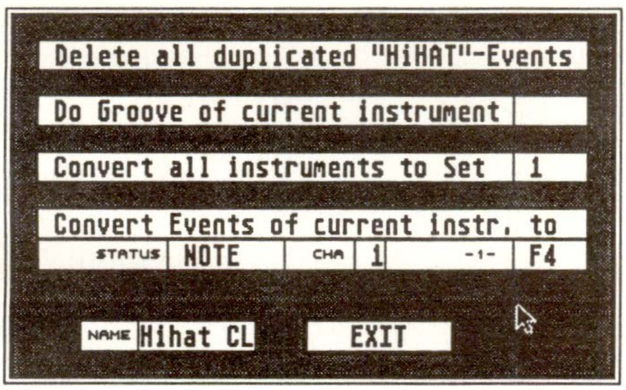
9.2 Swapping Instruments' positions

You can swap the positions of Instruments, to make, for example, a bass drum and open hihat appear directly one above the other.

To do this, drag the "source Instrument" on top of the "destination Instrument" with the left mouse button (drag it by the name area) and press the right mouse button before releasing the left mouse button (a "legato" click, the same way as for moving a track on the main page). This will swap the Instruments' display positions without affecting their data.

9.3 Hyper Edit functions window

If you right-click the Instrument's name area, a window will open containing a number of functions.



Each function is activated by clicking the field bearing its name. "EXIT" will take you out of the window without activating any function.

9.3.1 "Delete all duplicated "HiHat" events"

Where you have Instruments showing events that were recorded in realtime, and you wish to retrospectively delete another Instrument's events that occupy the same time position, ensure the Instruments are neighbours, enable their "HHAT" parameters (ticks in the "HHAT" column) and click the "Deleting all duplicated "HiHat" events" field: priority is given to the Instrument from which this function is carried out.

For example, events in the "open Hihat" Instrument will delete events in the "closed Hihat" Instrument which are located on the same time position in the track.

9.3.2 "Do Groove of current Instrument"

This function allows you to quantize or "groove" a Hyper Instrument separately. Realtime recordings within a track can be processed after recording in many different ways including preset grooves, user grooves and so on. Simply set the desired value and click "Do Groove of current instrument".

Note that Grooves "16 A" and "8 A" are equivalent to quantize values "16" and "8" (straight 1/16ths and 1/8ths).

This makes it easy to manage percussion recordings within a track, by creating separate groove settings and separate delays (DLY) for each Hyper Instrument, as well as creating separate velocity changes using the "'Control-Mouse'" combination.

9.3.3 "Convert events of current Instrument to..."

This function allows you to convert all the events of an Instrument into any other events. There are separate settings for Status, MIDI Channel and where necessary the "first data byte". To do this, open the Instrument's functions window whose events you want to convert; enter the desired parameters (Status/Channel/-1-) in the window and click "Converting events of...".

For example, if you want to convert a bass drum into a shaker: right-click the name of the bass drum Instrument and set the shaker note in the window under "-1-".

Note: do not forget to change the name of the Instrument as well.

The "Transform" function also performs a similar job *(see Chapter 24: "TRANSFORM")*.

9.3.4 "Convert all Instruments to Set..."

This function allows you to convert the events of all Hyper Instruments in a Set at one pass according to the definitions of another Set.

The most common use of this function is allocating different drum computers, multitimbral modules, samplers etc. according to their note allocations.

The following are important:

- The key allocations of two different MIDI devices must already be defined in two different Sets.
- Both Sets must use the same order when assigning a drum instrument to a Hyper Instrument (eg kick = Instrument 1, snare = Instrument 2, etc).

For example, suppose you want to adapt a drum track originally done for a Roland D-110 to an Emu Proteus module. If the allocation for the D-110 is in Set 1 and that for the Proteus is in Set 8, you need to do the following:

- Activate Hyper Edit for the drum track
- Select Set 1 - Open the Instrument's functions window (right-click on Instrument name)
- Set "Convert all Instruments to Set 8" and click this field.

The drum track will now sound with the Proteus' sounds.

16. Matrix Editor

16. Matrix Editor

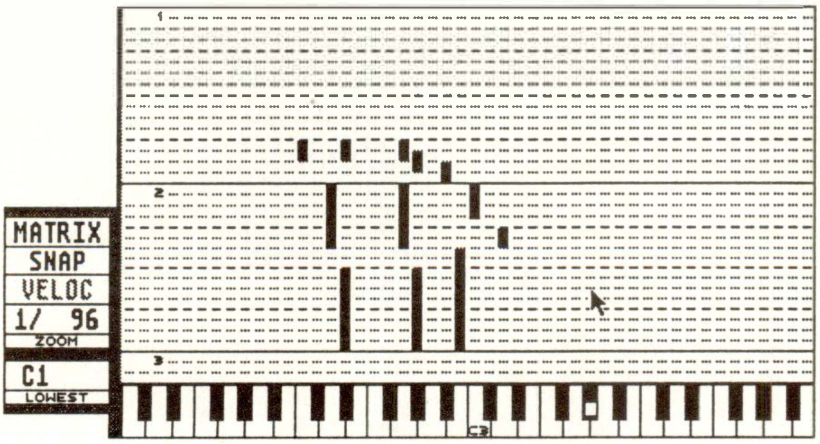
1. The basics

In the event editor, pressing 'K' or selecting "MATRIX display" in the "Edit" menu or clicking the "MATRIX" icon on the left of the event editor screen activates the matrix editor, a graphical, interactive display of notes in the form of beams.

It is useful as a general purpose graphical editor, with special emphasis on the editing of note lengths.

Pitch is displayed from left to right, the time position of the note is the top end of the beam, and the length of the note is the length of the beam.

Clicking a beam in the MATRIX editor makes the event list cursor jump to that note event in the list. The matrix editor is simultaneously active with the event list: interacting with a note in one editor will affect the other.

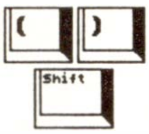


The matrix editor will not run simultaneously with the score editor or Hyper Edit.

2. Dividing the screen

The dividing line between the matrix editor and event list is moveable: click and drag the line up or down.

The event list can be reduced to one line of information: this will always show the "current" event.

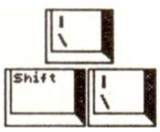


The '(' and ')' keys in the calculator keypad scroll the matrix display bar-by-bar; simultaneously pressing 'Shift' scrolls the display in smaller steps.

3. Zoom In, Zoom Out

Click the "ZOOM" value to control the resolution of the matrix editor. You may zoom in and out of the display: "1/768" means that one pixel (one small point of the screen display) represents a 1/768 note; in "1/16", a pixel represents a 1/16 note.

The black, solid lines are bar lines; the grey, dashed lines represent the beats; the dotted, dashed lines represent the divisions of the beat (the "display format" seen in the "information bar" along the top of the screen) divisions, eg 1/16ths.



Keys '\' and 'Shift-\' zoom the display from the ST keyboard (USA: 'Z' and 'Shift-Z').

4. Entering and deleting notes; "SNAP" mode

Left-clicking the matrix plays a note at the pitch of the click. A "dot" will follow the mouse's movements on the screen keyboard along the bottom of the screen. The keyboard is five octaves wide; its base note can be changed by clicking the box marked "LOWEST".

Right-clicking the matrix when "VELOC" is disabled enters a note at the precise location of the tip of the mouse pointer. The note length, MIDI Channel and velocity all depend on the last note to have been clicked or edited.

When "SNAP" is enabled, beams will snap in to the nearest division, ie they will "auto-quantize".

Right-clicking a beam will delete it.

5. Transposing and moving notes

Clicking and dragging a beam left or right will transpose a note.

Clicking and dragging a beam up/down will move a note in time.

The first direction you move in dictates whether you are transposing or moving. Adding the right mouse button allows you to move in any direction. You will hear the note move.

CREATOR automatically prevents you from "nesting" notes, that is, from forcing two notes sharing the same pitch and Channel to overlap.

6. Editing note lengths

Clicking and dragging a beam up and down by its lower end allows you to change the note length.

With very short notes, click and hold the mouse button in the area behind the beam, then move the pointer up into the beam - this engages the lower end which can then be moved.

7. Editing velocity

When "VELOC" is enabled (velocity edit), clicking and scrolling the mouse pointer on a beam with the left or right mouse button increases or decreases the note's velocity.

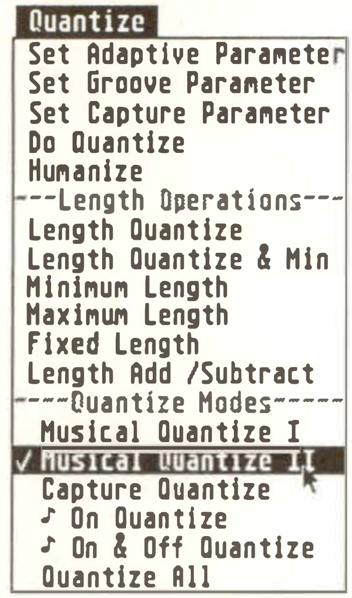
17. Quantize, Groove Design, Adaptive Groove

17. Quantize, Groove Design, Adaptive Groove

17. Quantize, Groove Design, Adaptive Groove

QUANTIZE, GROOVE DESIGN, ADAPTIVE GROOVE

17



Quantize, Groove Design and Adaptive Groove are important functions in CREATOR and NOTATOR, as they change the time positions of events (notes in particular) according to pre-programmed criteria. They are used especially to automatically correct human timing deficiencies, but they can be used "creatively", such as using Groove Design to give a "swing" feel to music that was originally played in strict time.

All three error-correcting functions are available as "track parameters" for each track: the QUANTIZE parameter includes the Adaptive Groove values if clicked with the left mouse button.

QUANTIZE is the classic method of auto-correcting timing: it has a range of preset error-correcting templates.

GROOVE DESIGN has two sides to it:

1. It provides further preset error-correcting templates based on "swing" feels and other timings.
2. It allows the user to freely design his/her own error-correcting templates.

With ADAPTIVE GROOVE, the Program automatically selects its error-correction from a range of pre-defined templates.

GROOVE DESIGN is able to do anything that QUANTIZE can do, and ADAPTIVE GROOVE can do anything that GROOVE DESIGN can do.

For any error-correction to work properly, you must have recorded the music in time with the metronome, and ideally have played as accurately as possible.

Otherwise, the program cannot guess where your beat is, and cannot apply a timing template to the music. The more accurate your original playing, the more you can do with the error-correction.

We recommend you start by familiarizing yourself with QUANTIZE and the preset GROOVES (eg 16 B and 16 C). After that, you are ready to use ADAPTIVE GROOVE.

1. Quantize

1.1 The basics

Quantization is the program's way of adjusting the time position of events to conform (with a range of strictness) to a preset "timing template": those recorded notes that do not fall exactly on the quantization steps (eg 1/16ths) of the timing template are shifted so that they do.

Quantization, because of the amount of calculation involved, has to alter the timing of events. Of all the other track parameters such as "TRANSPOSE", which are "playback" parameters that are calculated in realtime as the data is played back, QUANTIZE and GROOVE are the exceptions *(see Chapter 30: "APPENDIX", section 1.1)*. This, however, will not affect you in practice, since:

QUANTIZE and GROOVE are reversible, can be applied before, during or after recording (with results you hear immediately) and generally behave like the other track parameters.

You will notice that, even though QUANTIZE and GROOVE act like the other track parameters, their effect on time positions can be seen in the event editor, something not possible with the other track parameters. This is so you can make the correct musical decisions without guesswork, since timing is so important.

In the main page, pressing 'F' ("Fix Quantize") will fix the time positions of the events in the track at their current (quantized or grooved) positions *(see Chapter 6: "TRACKS", section 4.3 "Fix Quantize/ Groove").*

1.2 How to...

A track is quantized simply by scrolling to the desired QUANTIZE value in the track parameter box. Each track can have a different QUANTIZE value.

The values are: 1/4, 1/6, 1/8, 1/12, 1/16, 1/24, 1/32, 1/48, 1/64, 1/96.

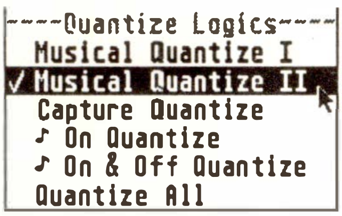
The "1/768" or "1/1536" settings represent the track in its un-quantized state (sometimes called "real-time").

Clicking the "DO QUANTIZE" icon on the main page or in the "Quantize" menu, or pressing 'Q' quantizes the current track with the QUANTIZE or ADAPTIVE GROOVE value last used in any track.

A quantize value given to an empty track will lead CREATOR/NOTATOR to "automatically quantize" after recording in that track.

This means there is no need to quantize after each recording, as quantizing occurs automatically when ending a recording via STOP or START. Apart from the time-saving aspect, there is no difference between quantizing before or after a recording. If recording in CYCLE mode, quantizing will occur automatically after each round *(see Chapter 7: "RECORDING").*

1.3 Quantize mode



In the "Quantize" menu there is a range of different quantize modes. The program defaults to "Musical Quantize II" mode.

The quantization mode is selected by clicking in the menu; the current mode has a tick by it. Only one mode is available at a time.

Changing mode does not affect already-recorded tracks, only future recordings. However, using "DO QUANTIZE" on an already-recorded track with the new mode in force will re-quantize the track with the new mode.

The following modes are available:

1.3.1 "Quantize all"

The only mode which quantizes every type of event: Notes, Pitch Bend, Controllers etc. Its use is probably limited to the creation of special effects.

1.3.2 "Note On and Off quantize"

Quantizes Note On and Note Off events independently of each other. This can create some drastic note length alterations, which can appear as either very long or very short notes (some so short that they will, depending on the sound, sound "swallowed"). This quantization effect can be used to produce "slap-bass" or "picked-guitar" results.

1.3.3 "Note On quantize"

Quantizes Note On events only, does not move Note Offs: will therefore change the note length slightly.

1.3.4 "Musical Quantize I"

Quantizes Note On events, keeping the note length intact.

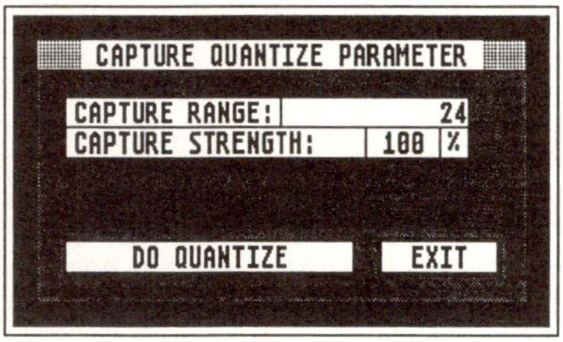
1.3.5 "Musical Quantize II"

The default quantization for all types of music in all situations, since it alters the "musicality" of the music as little as possible: it quantizes like "Musical Quantize I" but the danger of the mode misinterpretating the timing is almost zero because the musical context is taken into account.

The decision as to which position a note receives is influenced both by the note itself and the surrounding notes. NOTATOR/CREATOR will recognize systematic timing characteristics, interpret and evaluate them and react accordingly. For instance, where there is any doubt, "Musical Quantize II" will tend to advance the notes of someone who always tends to play behind the beat. Chords are treated as a whole. In practice, "Musical Quantize II" is very inconspicuous and the quantized result will virtually always be as you had expected.

1.3.6 "Capture Quantize"

Allows you to set a "Capture Range" and "Capture Strength" on "Musical Quantize II" mode. In other words, you can quantize a track, but set limits as to what gets corrected, and by how much. Like all quantize modes, Capture Quantize is reversible.



Click on "Set Capture Parameters" in the "Quantize" menu:

"**CAPTURE RANGE**" gives a range either side of the ideal quantize step, expressed in 1/768th notes. If a note lies inside the range, it will be moved; if outside, it will remain where it is, unquantized.

Note: a Range of "24" means 24 pulses before and 24 pulses after the "ideal" quantization step. "24" is therefore the same as a normal 1/16th quantization since the area between two quantization steps is fully covered by two neighbouring notes' Ranges (1/16th is 48 pulses). A Range of "10" at a quantization of 1/16ths would therefore leave an unquantized area of 28 pulses between each 1/16th, etc.

Example:

Capture Range 96 =
standard 1/4 note quantization.

Capture Range 48 =
standard 1/8 note quantization.

Capture Range 24 =
standard 1/16 note quantization.

"**CAPTURE STRENGTH**" determines by how much a note will move if it is within the Capture Range, expressed as a percentage. - A 100% setting will move the note all the way to the nearest quantization step, which is what "Musical Quantize II" does.

- A 50% setting will move the note only half the time-distance toward the quantization step.
- A 1% setting will barely move the note: it will remain virtually unquantized.

So Capture Strength allows the correct "dose" to be given, ranging from "no quantization at all" to "completely quantized".

Clicking "DO QUANTIZE" in the "Set Capture Parameters" window will immediately carry out the quantization in the current track and change the quantize mode (for future quantization) to "Capture Quantize". "EXIT" leaves the window without activating "Capture Quantize" mode.

Examples:

Quantize =	any value
Capture Range =	maximum amount
Capture Strength =	100%

This is equivalent to Musical Quantize II.

Quantize =	1/4
Capture Range =	24
Capture Strength =	100%

Here, any notes that are within 24 pulses of quarter note positions will be moved all the way to them. Other notes will remain unaffected. This can be useful in solos, where you have total timing freedom, except that the beats are tightened up.

Quantize =	1/16
Capture Range =	48 or more
Capture Strength =	75%

Here, all the notes come within the Range, as "48" is greater than the distance between two 1/16th notes. However, notes will only be moved part of the distance to the "ideal" 1/16ths. In a solo, all the notes will be tightened up, but not so much as to be "inhuman".

2. Groove Design

2.1 The basics

Historically, sequencer quantization has been used as a simple way of correcting the timing errors of recorded notes so as to give the music a "tighter", more "polished" feel.

Because the timing of computers is so precise, a whole generation of musicians is growing up, whose timing expectations are quite different from the days before these advanced sequencers were around. Modem "high-tech" musicians have come to regard quantized timing as the norm , and human timing as somehow below standard, such that even technically-proficient musicians have felt that they needed to quantize their playing via a computer in order to be able to compete. The down-side of this searching for perfection is the loss of much of the human feel that went into the original recording of the notes.

Groove Design presents two ways of dealing with this problem of "machine versus man":

Preset grooves: firstly, it allows you to call up preset micro-timing templates ("grooves"), such as all kinds of swing-timings, quintuplets, septuplets, combined error-correction to 1/16ths and 1/24ths simultaneously, etc.

User-defined grooves: secondly, it allows you to take tracks you have recorded and use them to error-correct the timing of other tracks. The computer's analysis of the timing characteristics of the template track means that all the tracks that are "looking at" the template will play together in perfect time with each other, without the necessity of imposing a "blanket" error-correction.

Grooves can be applied or removed during recording or playback. Switching between grooves or between GROOVE and QUANTIZE will always take the original timings of the notes as a starting point.

The note lengths (gate time) will normally remain unaltered. If the program detects the fact that a Groove parameter has forced two notes of the same pitch and MIDI Channel to overlap, the length of the first note will be correspondingly reduced.

2.2 Preset grooves

Scrolling the "GROOVE" track parameter with the right mouse button allows you to access a range of preset grooves.

You may alter the groove parameter at any time, even during recording and playback, and any changes made will have an immediate effect on the data.

Pressing 'G' ("DO GROOVE") applies the groove value last used in any track to the current track.

A groove value given to an empty track will lead CREATOR/NOTATOR to "automatically groove" after recording in that track.

The following preset grooves are available:

"16 A":	same as Musical Quantize II, 1/16th note (50%)
"16 B":	Swing 54.1%
"16 C":	58.3%
"16 D":	62.5%
"16 E":	66.6%
"16 F":	70.8%
" 8 A":	same as Musical Quantize II, 1/8th note (50%)
" 8 B":	Swing 54.1%
" 8 C":	58.3%
" 8 D":	62.5%
" 8 E":	66.6%
" 8 F":	70.8%
"8-12":	combined error-correction of 1/8 and 1/8 triplets
"1216":	combined error-correction of 1/16 and 1/8 triplets
"five":	Quintuplet error-correction
"sept":	Septuplet error-correction
"nine":	Nine-tuplet error-correction
"Free":	This template is a special case. It provides a "floating" swing tem-

plate so that you are not stuck with using just one of the preset templates. It stops the offbeats of a swung pair of notes from being error-corrected if they fall in the area, for instance, between the 1/16th offbeat and the 3rd triplet note (ie between "1 1 2 1" and "1 1 2 17": the "Free" zone). This means that you can be fairly free with the degree of swing you play: your "swing factor" will not be lost. Because some of your notes are not being corrected (in the interests of "feel"), it is best used for solo runs etc, rather than for multi-track laying.

The two combined error-correction grooves are less flexible than their Adaptive Groove *(see below)* equivalents, because they do not take the musical context into account.

Tip 1: use "Fix" where you are swinging a track that was played in strict time (see Chapter 6: "TRACKS", section 4.3).

Tip 2: to groove all the tracks of a pattern, press 'Shift' while changing the "GROOVE" track parameter (see Chapter 6, section 2).

2.3 User-defined grooves

Scrolling the "GROOVE" track parameter with the left mouse button allows you to access a range of user-defined grooves.

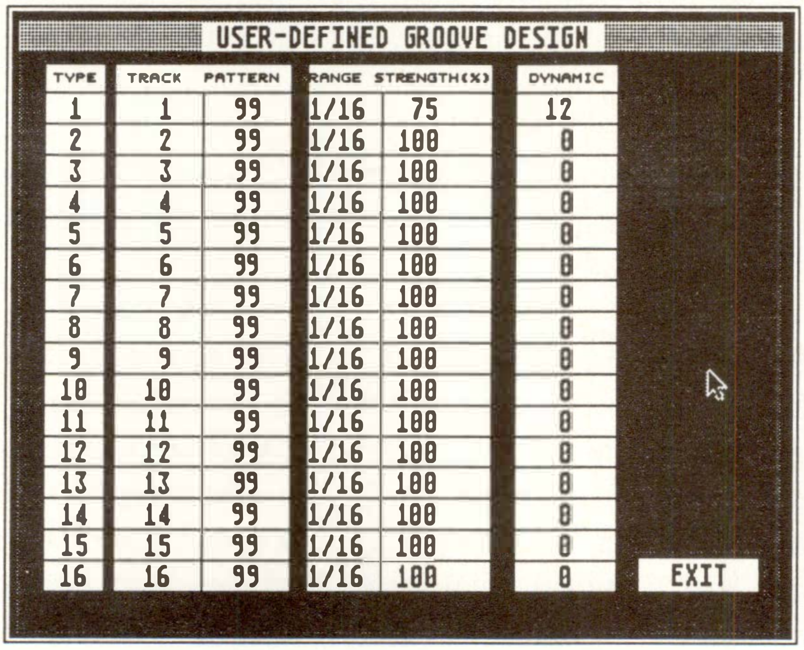
Groove Design allows you to design your own timing-correction templates. The templates are based on the time positions of notes in a track, so where there is a note, there is a potential timing-correction step. A template track is created either by defining a track recorded in realtime as a template, or by manually entering notes into a track.

"Set Groove Parameters" in the "Quantize" menu is where you can determine which track is to be used as timing-correcting template for the other tracks: in one of the 16 "Groove Type" lines, enter the pattern and track of the template and any Capture Range and Strength.

When a track has been defined as an timing-correcting template, any track that is instructed to "look at" this track (via its "Groove Type") will have its notes moved to time positions that as far as possible coincide with those of the template.

The 16 user-defined templates are activated by scrolling to the "Us 1" to "Us16" values in the "GROOVE" track parameter: "Us 1" is "TYPE 1" in the "Groove Design" window, etc.

The template track can be as long as you wish. It can even be "looped", which means that the "template" part will consist of the selected number of beats which will loop from the top of the track to the selected loop-point.



USER-DEFINED GROOVE DESIGN

TYPE	TRACK	PATTERN	RANGE	STRENGTH(%)	DYNAMIC
1	1	99	1/16	75	12
2	2	99	1/16	100	0
3	3	99	1/16	100	0
4	4	99	1/16	100	0
5	5	99	1/16	100	0
6	6	99	1/16	100	0
7	7	99	1/16	100	0
8	8	99	1/16	100	0
9	9	99	1/16	100	0
10	10	99	1/16	100	0
11	11	99	1/16	100	0
12	12	99	1/16	100	0
13	13	99	1/16	100	0
14	14	99	1/16	100	0
15	15	99	1/16	100	0
16	16	99	1/16	100	0

EXIT

The "Groove Design" window has 16 lines, so allowing up to 16 user-defined "Groove" templates to be active at the same time, ie rhythmical/dynamic templates whose source can be any track.

The first column "TYPE" shows the Groove number (US 1 to US 16). The second and third columns ("TRACK" and "PATTERN") determine the source of the Groove. The fourth and fifth columns determine, as in "Capture Quantize", the "Range" and "Strength" of the template.

"**RANGE**" gives a range either side of each template note, expressed in 1/768th notes. If a "slave" note lies inside the range, it will be moved; if outside, it will remain where it is, unquantized.

"**STRENGTH**" determines by how much a "slave" note will move if it is within the Capture Range, expressed as a percentage. A 100% setting will move the note all the way to the nearest template note. A 50% setting will move the note only half the time-distance toward the template note. A 1% setting will barely move the note: it will remain virtually unquantized.

So "Strength" allows the correct "dose" to be given, ranging from "no timing-correction at all" to "completely corrected".

In the above example, pattern 99 is shown as containing 16 tracks, each of which is acting as a user-defined template. This is one way of organizing a collection of template tracks; the advantage here is that they can be collectively saved to/loaded from disk via "Save/Load Pattern". You may also like to save such a pattern of favourite templates in your "AUTOLOAD.SON" *(see Chapter 28: "DISK OPERATIONS", section 2.3 "Autoload Song").*

It can make sense to sort the templates in order of increasing effect, so that you can compare the, say, "weakest" timing corrections starting at Us 1 against the "strongest" in Us16.

Tip: use the 'Control'+mouse feature to save time when scrolling from, say, "Us 1" to "Us16", as you can switch over in one leap (see Chapter 3: "GENERAL HANDLING", section 1.2).

2.3.1 Examples of user-defined grooves

Example 1: User-defined swings (eighths): you yourself may program swing times into a user-defined template track; you are not restricted to using the preset swings of A-F. First, you must create the template track

- enter the event editor of track 1, pattern 99 via "EDIT".
- enter two notes (pitch irrelevant, since all we are interested in is time positions). The display "Format" is assumed to be 1/16.

1 1 1 1 any pitch

1 1 3 x any pitch

Where "x" is you could enter any value you please : a "1" would mean no swing at all (50%). Try entering a "9":

- LOOP the track after one beat: "1".

This way, the template loop is repeated every beat which means that it can time-correct a track of any length.

- In the "Set Groove Parameters" window, enter:

Type 1 = pattern 99, track 1, Range 48, Strength 100%.

You have defined "GROOVE Us 1". Now whenever you give a track a GROOVE value "Us 1", the track will be error-corrected according to the template track. In this particular case, the swing corresponds to preset Groove "8 C".

Variation: for a 1/16 swing feel, you would need to program four notes into the first beat of the template track:

1 1 1 1 any pitch

1 1 2 x any pitch

1 1 3 1 any pitch

1 1 4 x any pitch

For a normal type of swing feel the 1/768 represented by "x" would be of the same value, eg "5". But you can go much further in your experimentation.

Conversion Table: 1/768ths - Swing Percentages

	50%	54.1%	58.3%	62.5%	66.6%	70.8%	75%
1/8 swing:	1	9	17	25	33	41	49
1/16 swing:	1	5	9	13	17	21	25

Tip 1: an 1/8 swing template track can be changed to 1/16 with the use of "Double Speed", and vice versa with the use of "Half Speed".

Tip 2: the percent (and per thousandth) values may also be read directly in the event list if "Position in ms" in the "Flags" menu is enabled at a tempo reading of 60 for 1/8th notes, or tempo 30 for 1/16th notes. At these tempi, an event's time position can be exactly translated into swing percentages, eg event position 00.546 ms is exactly 54.6%. Once you have entered the values, you can of course change the tempo to whatever you like.

Example 2: suppose you want an eight-bar verse to have a slight swing:

1 1 1 1, 1 1 2 5, 1 1 3 1, 1 1 4 5 etc,

but the chorus needs something stronger:

1 1 1 1, 1 1 2 9, 1 1 3 1, 1 1 4 9 etc,

the passage between the two can be made to flow if in the last (eighth) bar of the verse, the template track is given:

8 1 1 1, 8 1 2 **5**, 8 1 3 1, 8 1 4 **5**,
8 2 1 1, 8 2 2 **6**, 8 2 3 1, 8 2 4 **6**,
8 3 1 1, 8 3 2 **7**, 8 3 3 1, 8 3 4 **7**,
8 4 1 1, 8 4 2 **8**, 8 4 3 1, 8 4 4 **8**

in other words, an increasing amount of swing with each beat.

In this example, two or four events in the template track with their LOOP values will not work. You would need a template track as long as the song itself. Using "Segment Copy" makes this easier to achieve: the four notes whose positions are 1 1 1 1, 1 1 2 5, 1 1 3 1, 1 1 4 5 make up a quarter note, so in "Segment Copy" *(see Chapter 18)* enter:

"Source: 1 1 1 1 to 1 2 1 1",
"To Position: 1 2 1 1",
"Number of Copies: 31".

This gives you the first verse, including that eighth bar which you now must edit as above.

Tip 3: until now, we have been delaying the off-beats. By delaying or pushing all the beats over long sections, you can achieve a pushing or dragging type of feel in the music.

Tip 4: the character of a "groove" can be reinforced further if there is an element of Velocity dynamic in the track. One tends to heavily accent the beat; with percussion instruments like the hihat, clave, shaker, cowbell etc it makes more sense to stress the weaker beats (see Dynamic Groove, below).

Example 3: since any track can be used as a template track, even those tracks which have already been modified by GROOVE in some way can be used as template tracks.

This principle makes sense where, for instance, you wish to use the realtime playing of a real (!) drummer on his MIDI pads as your basis for timing-correcting the remaining tracks in the song: however, where this drummer has included pauses and drum rolls in his playing, this might confuse the program in its calculations. This is how you might reach a satisfactory result:

- Make up a long track consisting of quantized 1/16th notes using SEGMENT COPY (the pitch is irrelevant).
- Make a copy of the drum track (or maybe just the best bit), erase the rolls and make this the template track via the "Set Groove Parameters" window (eg Type 1/Us 1). Where necessary use the range and strength parameters to focus in on the desired beats.
- set GROOVE "Us 1" in the 1/16ths track.

- now use that (ex-)1/16th note track as the definitive template for the other tracks in the song by making it Type 2 in the "Set Groove Parameters" window" and setting "Us 2" in the GROOVE parameters of the other tracks.

That way, any pauses in the original drum track will not interrupt the playing since there is now a note on every sixteenth to keep the flow.

2.4 Dynamic Groove

The note velocities of a template track can be forced onto other "slave" tracks. Insert the Type number of the template track (Us 1-16) into the "slave" track's GROOVE parameter and press the 'V' key to "DO DYNAMIC GROOVE" (simply scrolling to the desired template value will not alter the velocity, just the timing).

How much the template track will affect the slave tracks' velocities when 'V' is pressed is determined by the setting in the Groove window's "DYNAMIC" column. 'V' has no effect on the time position of notes.

The window's DYNAMIC values range from 0 (no effect) to 15 (maximum effect). Dynamic Groove is event-altering and so can be reversed only by UNDO (until the next event-altering function is carried out). Since Dynamic Groove takes the latest version as its starting point, pressing 'V' progressively increases the effect, so try using lower values in the window and pressing 'V' more than once till satisfied.

Since the act of scrolling to a desired template activates the time-position-altering side of Groove Design, if a pure Dynamic Groove is desired without affecting the timing, set the track's STRENGTH value to 0% in the "Set Groove Parameters" window.

3. Adaptive Groove

3.1 The basics

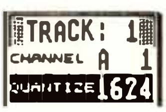
"Adaptive Groove" is a correction strategy for note positions, which brings together all the QUANTIZE and GROOVE templates in one function.

Whereas "Musical Quantize II" and "Groove Design" settings apply to the whole track, "Adaptive Groove" will independently recognize and analyze the structure of the recorded music, and will then quantize or groove segments of the track separately, depending on the requirements of the music.

Any combination of the quantize templates ("4"-"96"), preset grooves ("Free"-"16A") and user-grooves ("Us 1"-"Us16") is possible, up to eight templates at a time in what is called an "Adaptive Groove Set".

Eight of these "Adaptive Groove Sets" are available per song.

3.2 Applying an Adaptive Groove Set to a track



The eight Adaptive Groove Sets can be called up, one at a time, by scrolling the "QUANTIZE" track parameter with the left mouse button, starting from the "no quantization" setting "768"/"1536".

Each Set is user-nameable in the "Adaptive Groove Settings" window *(see section 3.3.3 below).*

NOTATOR and CREATOR come with seven pre-programmed Adaptive Groove Sets:

- 1624: 1/16ths and 1/16th triplets are recognized.
- 16C+: 1/16ths and 1/16th triplets are recognized, syncopated 1/16ths will be "swung" according to preset groove "16C".
- 1632: 1/16th and 1/32nds are recognized.
- All: 1/8ths triplets, 1/16ths, 1/16ths triplets and 1/32nds are recognized.
- Joha: 1/8ths triplets, 1/16ths, 1/16ths triplets and 1/32nds are recognized. Syncopated 1/16ths will be left uncorrected, according to preset groove "Free".
- 1216: 1/8ths triplets and 1/16ths are recognized.
- 1224: 1/8ths triplets and 1/16ths triplets are recognized.

As with user-defined Groove Design, any other settings are possible: see section 2 "Groove Design" above.

The last QUANTIZE template or Adaptive Groove Set to be chosen can be applied to other tracks by left-clicking the "DO QUANTIZE" icon or pressing 'Q'.

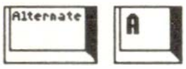
A right-click on "DO QUANTIZE" returns the template in the QUANTIZE track parameter (whether it is a quantize template or Adaptive Groove Set) back to "768" or "1536" (no time correction). The same happens if you click the QUANTIZE parameter about 1 centimetre from the right edge of the track parameter box; use either mouse button, depending on whether the current template is quantize or Adaptive Groove.

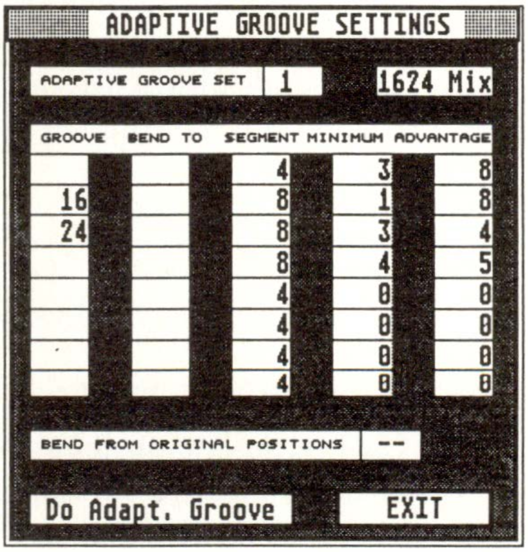
Tip: because Adaptive Groove is a wide-ranging correction strategy, initial calculation times can take longer than the simpler quantization. So, to select the desired Set in the "QUANTIZE" track parameter, use the 'Control'+mouse feature to jump straight to it (see Chapter 3: "GENERAL HANDLING", section 1.2).

3.3 Defining the Adaptive Groove Sets

To define the Adaptive Groove Sets, you use the Adaptive Groove Settings window: click "Set Adaptive Parameters" in the "Quantize" menu, or press 'Alternate-A'.

3.3.1. The Adaptive Groove Settings window





3.3.2 Set number

Click in the box at the end of the "ADAPTIVE GROOVE SET" line to select one of the eight Sets' numbers. Each complete window is a Set.

3.3.3 Set name

Each Set can be given a name of up to eight characters; the first four characters are visible in the "QUANTIZE" track parameter on the main page (in other words, you select the Adaptive Groove Set by the name you give it rather than by its number).

3.3.4 "GROOVE"

In the "GROOVE" column, you decide which quantizing and groove templates should prevail during the automatic analysis of segments of the recorded music.

Up to eight quantize and groove templates are available simultaneously in the column.

Any combination of the quantize templates ("4"-"96"), preset grooves ("Free"-"16A") and user-grooves ("Us 1"-"Us16") is possible. Clicking the left half of a "GROOVE" box with the left or the right mouse button deletes a template.

Tip: when experimenting for the first time, start by using just two templates to avoid getting confused.

Example 1: GROOVE

Line 1: 16
Line 2: 24

Result: combined correction of 1/16ths and 1/16th triplets.

This corresponds to the pre-programmed Set "1624".

Example 2: GROOVE

Line 1: 16
Line 2: 32

Result: Combined correction of 1/16ths and 1/32nds.

This corresponds to the pre-programmed Set "1632".

Example 3: GROOVE

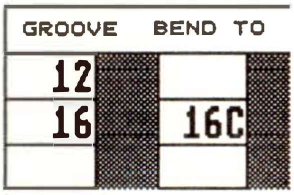
Line 1: 16 C
Line 2: 24

Result: combined correction of "swung" 1/16ths and metrically-exact 1/16th triplets.

3.3.5 "BEND TO..."

In the "BEND TO..." column you can decide whether there should be a second correction template, especially important when the first template is a groove.

When the "GROOVE" column templates have done their correction, there can be a final correction according to what is programmed in the "BEND TO..." column.



The same templates are available in the "BEND TO..." column as in the "GROOVE" one.

Example:

GROOVE	BEND
16	16 C
24	(blank) empty box

This corresponds to the pre-programmed Set "16C + 24".

Any segment which was analyzed as being a 1/16th by the "GROOVE" template will be "bent to" or transformed into "swung" 1/16ths.

Segments which are given the 1/24th "GROOVE" will not be affected by "BEND TO...".

3.3.5.1 "BEND FROM ORIGINAL POSITIONS ON/OFF"

In the "BEND FROM ORIGINAL POSITIONS ON/OFF" line, you can decide whether, before there is any processing by the "BEND TO..." column, the data should first be corrected according to the "GROOVE" column.

BEND FROM ORIGINAL POSITIONS	O N

"BEND FROM ORIGINAL POSITIONS: ON"

This corresponds to the normal timing-correction logic for a track, with calculations based on the notes' original time positions.

"BEND FROM ORIGINAL POSITIONS: (OFF)"

Here, further correction calculations are based, not on the notes' original positions, but on their new positions acquired as a result of event-altering (like "Fix Quantize" *(Chapter 6: "TRACKS", section 4.3)* or "Process Data" *(see Chapter 6, section 4.2)*. Here, however, the notes' original positions are remembered.

Tip: for realtime-recorded music which contains different amounts of "swing" combined with full triplets, you may find better results when "BEND FROM ORIGINAL POSITIONS" is switched off.

3.3.6 Regional template structure

3.3.6.1 "SEGMENT"

In the "SEGMENT" column, each template can be given a segment length ranging from a quarter note to a sixteenth. This determines over what period a template is active, within which a particular correction takes place.

Example:

GROOVE	BEND TO	SEGMENT
6	--	8
24	--	8

If, having analyzed the structure of the music, "Adaptive Groove" decides to use a 1/16th template, then in the above example, the corresponding segments within the region of an 1/8th note will be corrected (eg the first and fourth eighths of a bar).

If, having analyzed the structure of the music, "Adaptive Groove" decides to use a 1/24th template, then in the above example, the corresponding segments within the region of an 1/8th note will be corrected (eg the third and fifth eighths of a bar).

Important! The program splits the music up into the segments which are defined in the "SEGMENT" column of the Adaptive Groove Set. Segments not included here remain unavailable.

If segments of differing lengths are selected, then there should be one or more "alternatives" to the smallest value.

Example:

	GROOVE	BEND TO	SEGMENT
Line 1:	16	--	8
Line 2:	16	--	16
Line 3:	32	--	16

If "Adaptive Groove" decides, for example, to correct the first 1/16th segment of a bar with a 1/32nd template (Line 3), the additional line 2 (1/16th segment with a 1/16th template) acts as an alternative for the second 1/16th segment of the bar. Without this alternative, it might also be corrected with a 1/32nd template.

In general: several small segments automatically make up an alternative if they fit into a larger segment.

Tip: the "SEGMENT" column can allow nonsensical settings: if the "GROOVE" value is 1/12th, and the "SEGMENT" value 1/16th, the program cannot process this. To recognize a 1/12th template, one or more 1/8th triplets must be set in the "SEGMENT" column.

3.3.6.2 "MINIMUM"

Within an "Adaptive Groove" segment, there must be a minimum number of notes available before a decision in favour of the template can take place: the "MINIMUM" column defines this minimum number of notes within the segment.

"MINIMUM" works closely together with "SEGMENT" and is an important factor in the choice of the template. If "MINIMUM" is set to "1", it has no effect.

Example:

GROOVE	BEND TO	SEGMENT	MINIMUM
16	--	8	1
24	--	8	3

These two lines carry out a combined correction of 1/16ths and 1/16th triplets. However, the 1/16th triplets will only be accepted for correction if the complete set of three notes is in the segment.

If the second line in the above example had a "2" in the "MINIMUM" column, "incomplete" triplets would be accepted as well (though there must be at least two per 1/8th segment).

Tip: you can also have settings that do not make sense in the "MINIMUM" column. If the minimum number of notes will not fit in the segment, the template cannot be chosen (for example: "GROOVE" 1/24, "SEGMENT" 1/8, "MINIMUM" 5).

Where there is any doubt, the program will choose any one of the available "GROOVE" templates.

3.3.7 "ADVANTAGE"

The value (0-10) in the "ADVANTAGE" column gives the amount of advantage a "GROOVE" template has over the other templates. "GROOVES" with larger "ADVANTAGE" values are more likely to influence the correction than others.

As a rule, there are practical advantages in giving smaller "GROOVE" values fewer chances, so that any timing problems in the music can be caught and dealt with.

Example:

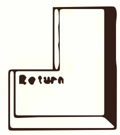
Groove	Bend To	Segment	Minimum	Advantage
16	--	8	1	10
24	--	8	2	7
32	--	8	4	6

In this example, the 1/16th correction has the greatest advantage. Although incomplete 1/16th triplets will be accepted, they must have been very accurately played. Only four 1/32nd notes in a row will be recognized, and only if they were played accurately.

Tip: all "ADVANTAGE" settings are relative to each other: if "10" is set in each line, it is the same as having "0" in each line.

3.4 "Do Adaptive Groove"

The current Adaptive Groove Set can be applied directly to the current track by clicking the "Do Adapt. Groove" icon. Clicking "EXIT" or pressing 'Return' quits the window without actioning the function.



Alternatively, select one of the Adaptive Groove Sets in the "QUANTIZE" track parameter.

The last QUANTIZE template or Adaptive Groove Set to be chosen can be applied to other tracks by left-clicking the "DO QUANTIZE" icon or pressing 'Q'.

3.5 Managing the Adaptive Groove Sets

Although Adaptive Groove Sets can be "tailor-made" for pieces of music which you have recorded in realtime, it makes sense to have "tried-and-tested" Sets available at any time: save these in your "AUTOLOAD.SON" *(see Chapter 28: "DISK OPERATIONS", section 2.3).*

The eight Sets can also be loaded into existing songs via "Load System" in the "File" menu *(Chapter 28, section 3).*

4. Note Length Quantize

The lengths of notes can be quantized without this affecting their positions *(see Chapter 19: "EVENT-ALTERING FUNCTIONS").*

18. Copy, Merge, Insert, Cut, Delete, Move, Swap

18. Copy, Merge, Cut,
Insert, Delete,
Move, Swap

1. Mouse operations within a pattern

1.1 Track copy

Within a pattern, to duplicate a track, drag it (by its name) to a new empty destination track and release the mouse button.

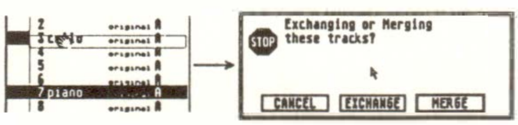
1.2 Track merge

Within a pattern, to merge two tracks, drag one (by its name) on top of a new recorded destination track and release the mouse button. You will be asked to confirm or cancel the operation.

Where any of the two tracks' parameters are the same (eg both are set to Channel 5), those track parameters will remain as they were; where any of the tracks' parameters are different, the events of both tracks will be altered instead according to what each track's parameter was *(see Chapter 6: "TRACKS", section 4.4).*

1.3 Track exchange

Within a pattern, to swap the position of two tracks, drag one (by its name) on top of a new recorded destination track and release the mouse button. You will be asked to confirm or cancel the operation.



1.4 Track move

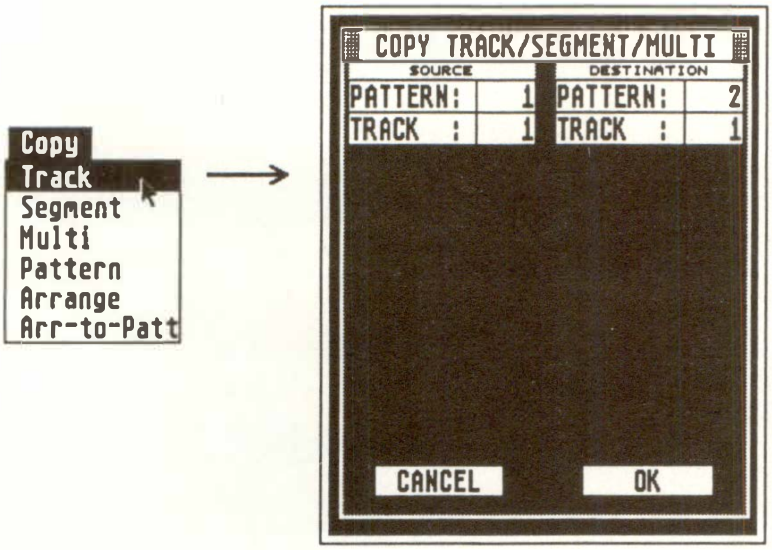
Within a pattern, to move a track to a new position, drag it (by its name) to a new empty destination track; without releasing the left mouse button, depress the right mouse button as well, then keeping the right mouse button depressed, release the left mouse button.

1.5 Track replace

Within a pattern, to replace a track with another track, drag it (by its name) on top of the track to be replaced; without releasing the left mouse button, depress the right mouse button as well, then keeping the right mouse button depressed, release the left mouse button. You will be asked to confirm or cancel the operation.

1.6 Track delete

Dragging a recorded track to the left hand side of the screen deletes it (or press 'Backspace'). However, you can get it back by clicking the "UNDO" icon (until the next delete or other event-altering process).



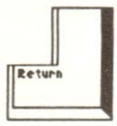
2. Copying a track

2.1 "Copy" menu: track

You may copy the events of a complete track including its track parameters (the "source" track) to an empty track in a different pattern (the "destination" track) with "Track" in the "Copy" menu.

If the destination track already contains data, you will be asked if you wish to MERGE the two tracks into the destination track or cancel.

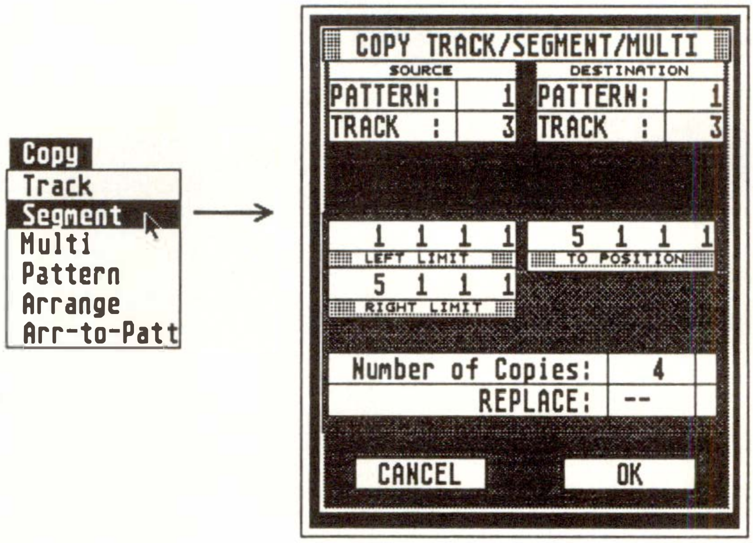
2.2 Copying a track via keystroke



Click the track you wish to copy then press 'Shift-C'. Now select the pattern, click the desired track position and press 'Return'. This will copy the track across.

This is a flexible alternative to the "Copy" menu, because you can select the track you want to copy first before looking for its destination position.

3."Copy" menu: segment



You may copy the events of part ("segment") of a "source" track to a "destination" track with "Segment" in the "Copy" menu.

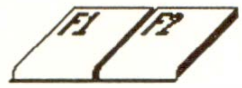
For the source track, select the segment's left (inclusive) and right (exclusive) limits, and select the destination track and the left limit or start position of the segment's destination.

If "REPLACE" is switched off ("--"), and the destination track already contains data, you will be MERGING the segment into the destination track.

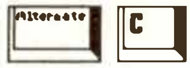
If "REPLACE" is switched "ON", you will be erasing the destination track's data at that point and replacing it with the segment.

The source segment may be copied many times end-to-end by selecting a "Number of Copies" value, so "filling" a track or part of track with the chosen segment.

The source track can also be the destination track.



If you are in the event editor, you can define the left limit by clicking that event and pressing the 'F1' key, and define the right limit by clicking the last note of the segment and pressing 'F2'.



When you go to "segment copy" (eg by pressing 'Alternate-C'), the limits will be ready. Note: because the right limit is always exclusive, it will actually show a position one pulse more than the last event, so that the last event is included in the segment.

Tip: before using Segment Copy with the "fill" feature, check whether the "LOOP" track parameter wouldn't be better: it uses no extra memory and is quicker to use, but you can only loop from 1 1 1 1 (see Chapter 6: "TRACKS", section 3.6).

3.1 Examples of segment copy

Example 1: bars 21, 22, 23 and 24 of a solo are to be copied to bars 1-4 of the same track, and what was already there is to be simultaneously erased:

Source:	
Left Limit	21 1 1 1
Right Limit	25 1 1 1
To Position	1 1 1 1
Number of Copies	1
Replace	ON

Example 2: when bars 1 and 2 of a drum track are copied as follows the result is one long track of 16 bars (7 new repetitions + the original):

Left limit	1 1 1 1
Right Limit	3 1 1 1
To Position	3 1 1 1
Number of Copies	7

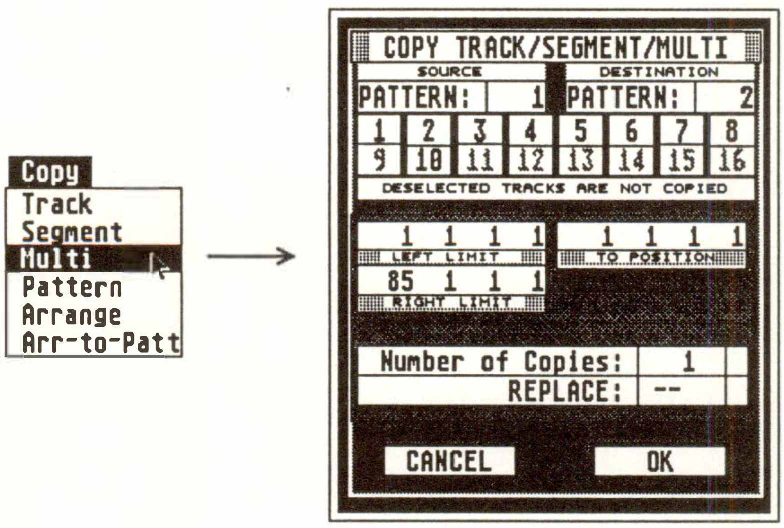
Example 3: a typical single 1/16th note repeated "sequencer" line is required over two bars:

- ensure the display format is set to "1/16" (because we are dealing with the third column of the time position - *see Chapter 5: "POSITIONING"*),
- select an empty track and enter its event editor (press 'E')

- enter one note at 1 1 1 1, then do as follows in "segment copy":

Left Limit	1 1 1 1
Right Limit	1 1 2 1
To Position	1 1 2 1
Number of Copies	31

4. "Copy" menu: multicopy

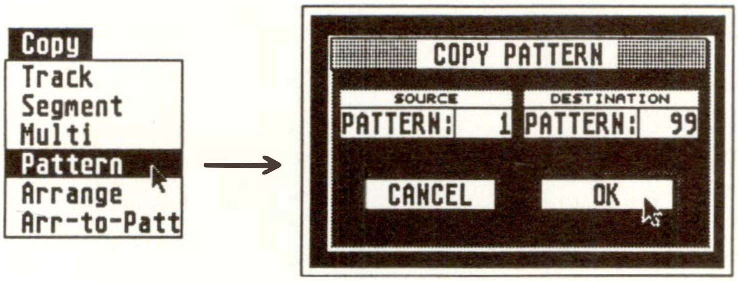


"Multicopy" in the "Copy" menu allows the copying of a segment of up to all 16 tracks of a pattern simultaneously.

This function uses the same parameters as "segment copy" with the difference that you can switch tracks on and off to determine which segments will be copied simultaneously, which is the same as using "segment copy" several times.

The source and destination segments must have the same track numbers, though these will be in different patterns.

5. "Copy" menu: pattern



This function allows the copying of a whole pattern with its 16 tracks to another pattern number.

6. "Mixdown 16 tracks"

"Mixdown 16 tracks" in the "Functions" menu (or press 'Alternate-M') merges all the tracks of the current pattern onto the top track.

The MIDI Channels of the individual tracks are forced onto their events, and the "host" track is switched to "original" Channel *(see Chapter 6: "TRACKS", sections 3.1.2 "Channel number "Original" and 4.4 "Merging tracks with differing track parameter values").*

7. Separating by Channel

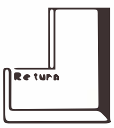
CREATOR and NOTATOR allow the events of up to 16 Channels to be in one track; this happens, for example, when you have "imported" a complete song from a different sequencer: the whole song will be recorded by CREATOR/NOTATOR into one track. The following functions allow you to extract events according to their Channels and place them in different tracks.

Extract One Channel
Demix All Channels
Mixdown 16 Tracks

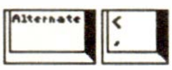
7.1 "Extract One Channel"

"Extract One Channel" in the "Functions" menu allows you to remove the events of one MIDI Channel in a track and deposit them in any empty track of any pattern.

- Click "Extract One Channel".
- Under "SOURCE", select the pattern and track from which you want to extract.
- Under "DESTINATION", select the pattern and track to which the extracted events are to go.
- Under "MIDI CHANNEL", select the Channel number of the events to be extracted, then click "OK"/press 'Return'.



7.2 "Demix All Channels"

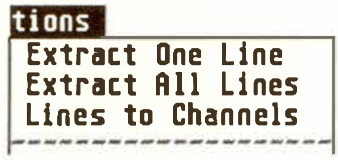


"Demix All Channels" in the "Functions" menu (or press 'Alternate-,') allows you to separate the events in a track according to their MIDI Channels and deposit them in the empty tracks of the current pattern.

Channel 1 will go to track 1, Channel 2 to track 2 etc.

This function is particularly useful when you want to work on a song that was imported from another sequencer: within a couple of seconds, the song is spread over the current pattern's tracks. Ensure the other tracks are empty before you "Demix".

8. Separating by "chord Voice"



The following functions (in the "Functions" menu [with the mouse pointer, touch the "...tions" syllable of "Functions"]) allow you to split up a track's chords into the chords' constituent notes or "Voices". For the functions to work properly, the notes in the chords must be on the same pulse. To ensure this is the case, quantize the track first, carry out the function, then de-quantize if needs be.

Note: the functions do not split a track's notes according to their pitch, but according to their relative positions within chords.

8.1 "Extract One Line"

"Extract One Line" extracts a single Voice from chords in the track.

In its dialog box, you can decide whether to extract the highest or the lowest Voice of each chord: the extracted notes will be placed in the next empty track in the pattern.

Repeated use of this function shaves off each line one-by-one to a separate track.

8.2 "Extract All Lines"

"Extract All Lines" splits up all the chords into their constituent Voices and deposits the notes as single Voices in the patterns's remaining empty tracks.

This is especially useful in NOTATOR where you have written, say, a piece for a wind ensemble on your MIDI keyboard, and you then wish to have each musical part on a separate track/stave.

8.3 "Lines To Channels"

"Lines To Channels" splits up all the chords into their constituent Voices by assigning the Voices to different MIDI Channels. No extraction to other tracks takes place.

All the events in the track must be set to Channel 1 before actioning this function.

"Lines To Channels" could be used, say, with NOTATOR's "Polyphonic" display function, which uses the MIDI Channels of events in a track to distinguish between its Voices.

9. Track-based cutting/ reversing

```
Cut Inside Locators
Cut Outside Locators
Reverse Inside Locat.
```

9.1 "Cut Inside Locators"

"Cut Inside Locators" ("Functions" menu) deletes all notes and events in a track which lie between the left and right locator positions.

9.2 "Cut Outside Locators"

"Cut Outside Locators" ("Functions" menu) deletes all notes and events in a track which lie beyond the left and right locator positions.

9.3 "Reverse Inside Locators"

"Reverse Inside Locators" ("Functions" menu) reverses the order of all the notes and other events in a track between the left and right locator positions.

10. Pattern-based cutting/ inserting

10.1 "Cut and Move Pattern"

```
Cut & Move Pattern
Insert & Move Pattern
```

"Cut and Move Pattern" ("Functions" menu) erases all the notes and events between the left and right locator points in all sixteen tracks in the current pattern and simultaneously relocates the data lying beyond the right locator to the left locator position, making a "seamless join".

(Note: UNDO is not available with this feature since more than one track is involved.)

10.2 "Insert and Move Pattern"

"Insert and Move Pattern" ("Functions" menu) introduces a blank space between the left and right locator points in all sixteen tracks in the current pattern by pushing back the data lying at the left locator point to the right locator position.

(Note: UNDO is not available with this feature since more than one track is involved.)

11. Deleting

11.1 "New Pattern"

"New Pattern" in the "File" menu asks whether you want to delete the data in the current pattern, and does so if you click "OK": this deletes the data in the pattern's 16 tracks.

11.2 "New Song"

"New Song" in the "File" menu asks you whether you want to "initialize" CREATOR or NOTATOR, ie wipe all existing music data and start again with a virgin program: make sure your data is saved to disk first. The action of loading in your "AUTO-LOAD.SON" has the same effect of giving you a fresh program with the advantage of loading your favourite default settings. (Loading <u>any</u> "*.SON" file erases the existing data anyway, so always check you have saved the existing data before you load.) *(See also Chapter 28: "DISK OPERATIONS", sections 2 "Load/save song" and 2.3 "Autoload Song".)*

11.3 "Quit"

Clicking "Quit" at the bottom of the "File" menu asks you whether you want to exit from CREATOR or NOTATOR and revert to the "GEM desktop". This destroys all your music data, so make sure you have saved it to disk first. If you are in the SOFT LINK environment, the only way to quit the program is to switch the computer off; programs in the other partitions, however, are quittable as usual.

11.4 Summary of delete and keep functions

Delete Track *(see this Chapter, section 1.6).*

"New Arrange" deletes the current arrange list *(see Chapter 20: "ARRANGE MODE", section 11).*

"Delete/Keep Events" in the "Functions" menu *(see Chapter 24: "TRANSFORM").*

Realtime "Delete/Keep Events" *(see Chapter 24: "TRANSFORM").*

"Fast Delete/Keep" in the event editor *(see Chapter 9: "EVENT EDITOR", section 19).*

Delete arrange list entry *(see Chapter 20, section 4).*

"Delete Short Notes" in the "Functions" menu *(see Chapter 19: "EVENT-ALTERING FUNCTIONS", section 11).*

Deleting individual events *(see Chapter 9: "EVENT EDITOR", section 6, Chapter 10: "SCORE EDITOR: BASIC FUNCTIONS", section 6.4, Chapter 15: "HYPER EDIT", section 5 and Chapter 16: "MATRIX EDITOR", section 4).*

"Delete File" in the "File" menu *(see Chapter 28: "DISK OPERATIONS", section 7).*

There are many other functions that have a deleting side to them ("Cut Inside Locators", "Cut and Move Pattern" etc). These are dealt with throughout the manual.

19. Event-Altering Functions

19. Event-Altering Functions

1. What means "event-altering"?

There are, fundamentally, two ways of affecting the data that flows from the MIDI output:

1. By using "playback" parameters that work on the data in realtime as it is being passed through the MIDI output. These include the "track parameters" and arrange mode "pattern parameters". "Playback" parameters do not alter the original data of the events, but only how they behave outside the computer.
2. By using "event-altering" functions that alter the original data of the events themselves while they are in the computer's RAM.
   Also included in the "event-altering" camp are all the changes you make yourself with the mouse, Hyper Edit etc in the event editor.

The effect of using event-altering functions as opposed to "playback" parameters is that you can see the alterations to the events in the event editor.

Event-altering functions include "Transform" *(Chapter 24)*, "Process Data", "Normalize", "Fix Quantize" *(all Chapter 6: "TRACKS")* and many others included in this Chapter.

The event-alterations are reversible by using "UNDO" because the original version is kept in a "buffer", but using "UNDO" to reverse a specific operation is only possible until you carry out the next operation that involves making alterations to events. You cannot "UNDO" operations that involve more than one track.

When using any of the following event-altering functions in sections 3 to 13, the name of that function will replace the existing track name if the track name begins with a star (ie you have not yet inserted your own name in place of CREATOR/ NOTATOR's default names eg "**OK**" or "* New *"). If the existing track name is one of yours, these function names will not erase it.

2. Forcing track parameter value onto events

The "track parameters" *(Chapter 6: "TRACKS", section 1)* on the main page are normally "playback" parameters: they affect data as it flows through the MIDI Output. However, their values can be forced onto the events in their track *(see Chapter 6, section 4 "When track parameters can be "event-altering")*.

3. "Quantize" menu: note lengths

```
---Length Operations---
Length Quantize
Length Quantize & Min
Minimum Length
Maximum Length
Fixed Length
Length Add /Subtract
```

3.1 "Length Quantize"

This quantizes the lengths of notes according to the selected template in the "Length Quantize" window, expressed as bar/beat/sixteenth/pulse; the lengths become complete multiples of this value.

Where an existing note is less than half the length of the "Length Quantize" template, its length is reduced to zero.

This can produce interesting results with certain sounds, such as "picked basses" or "clavinets".

3.2 "Length Quantize and Mininimum Length"

This has the same effect as "Length Quantize" (see above), but avoids note lengths of zero: the minimum note length is the length of the template.

This can be useful for ensuring chords are of the same length etc.

4. "Quantize" menu: "Minimum Length"

Any note length less than this template will be made longer.

5. "Quantize" menu: "Maximum Length"

Any note length greater than this template will be shortened.

6. "Quantize" menu: "Fixed Length"

With this function you can achieve note lengths which are all exactly the same; avoid too great a length, or notes of the same pitch may overlap.

The "Fast Transform" function in the event list has the same effect: set the desired length in one note and press 'Shift-T', which copies that length to all the following notes.

7. "Quantize" menu: "Length Add"

This adds the selected value to the length of notes.

8. "Quantize" menu: "Length Subtract"

This subtracts the selected value from the length of notes.

9. "Functions" menu: "Force Legato"

This alters a track's note lengths by lengthening/shortening notes so that they exactly abut one another, thereby creating a perfect legato effect (depending, of course, on the sound). Simultaneous notes in a chord are given the same length, but only if the notes share the same time position (if necessary, temporarily quantize the track, click "Force Legato", then un-quantize).

10. "Functions" menu: "Overlap Correction"

Overlap Correction
Force Legato

This corrects a track if it finds that notes played in a "lazy" legato fashion overlap each other. If such is the case, the previous note's length will be shortened so that its Note Off appears just before the following Note On.

The prevention of overlapping notes is very useful when using an older monophonic synthesizer (fitted with a MIDI interface, of course), since some of these synthesizers need a fresh envelope trigger for each note. Another use is with multi-timbral synthesizers, where "Overlap Correction" allows efficient use of all the synth's voices by stopping "wasteful" overlapping.

Exact chords - several notes on the same time pulse - are recognized, and an automatically-appearing dialog box asks you whether you wish to keep the chords, or delete all the constituent notes except one, depending on whether you want a strict monophony. To make chord notes of an unquantized track simultaneous, it is a good idea to quantize this track temporarily.

11. "Functions" menu: "Delete Short Notes"

This erases all notes whose lengths fall below the template you select here.

Wrong notes (often the result of inaccurate playing) tend to be notes of low velocity and short duration, and these can be easily spotted and eliminated by the program. Another use of this function would be to deal with the relatively common problem generated by guitar synthesisers, where spurious "sympathetic" notes of very short duration are triggered.

```
Delete Short Notes
Check: Duplicated ...
```

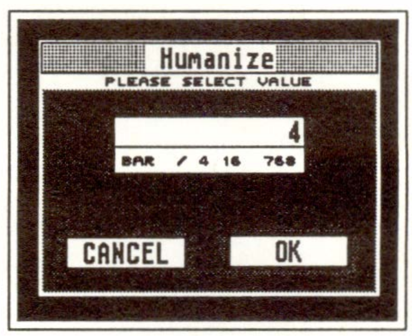
12. "Functions" menu: "Check Duplicated..."

This erases duplicated (ie identical position, Channel and pitch) notes and events, and simultaneously inserts any missing Note Offs.

"Check..." is the only way to insert missing Note Offs.

Duplicated notes can occur when, for example, you record while cycling, where the same note can be played more than once as the segment cycles. You can normally hear these duplications as a "phasing" sound, and looking in the event list will confirm this.

13. "Quantize" menu: "Humanize"

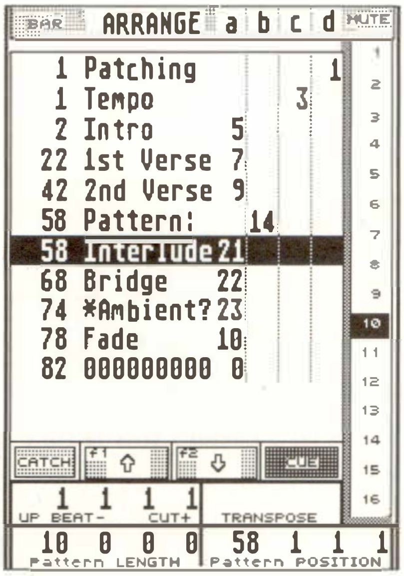


This function adds and subtracts a random amount of time to and from notes' time positions. Notes can thereby receive a certain amount of "quasi-human imprecision", with the advantage that limits can be set on the randomness.

For example, "8/768ths" would mean that all the events would be randomized up to 4/768ths forward and 4/768ths backward.

20. Arrange Mode

20. Arrange Mode



1. The basics

The arrange mode is a function which allows you to form an arrangement (song, film cue etc) by arranging entries, which represent patterns, in a certain order; it then plays back the entries in the order you have determined. Up to four patterns may play at the same time.

The arrange mode has two display modes, with easy switching between the two:

1. The arrange list, in which the arrange entries take the form of a sequential list of alphanumerical lines *(until section 16, this Chapter describes the workings of the arrange list).*

2. The Graphic Arrange Mode (GAM), which is a graphical representation of the patterns in the form of vertical beams *(see section 16 below).*

For instance, the verses, choruses, bridges, intro and outro of a piece can be recorded independently of each other in different patterns, each with up to 32 tracks, and assembled and played in the desired order in the arrange mode.

Each line of the arrange list or beam of the GAM is called an "entry": it contains the instruction to the program to play a certain pattern at a certain time, and displays the pattern's name, number and the chain it is playing in.

In this Chapter, we will refer to an "entry" when we are refering to the pattern as part of the structure of the arrange mode, and to a "pattern" at other times.

Tip: think of the arrange mode as a "sequencer for patterns". The entries in the arrange mode are not recorded material, but simply instructions that tell patterns when they should play.

There are 4 "chains" (a–d) in which any succession of patterns can be started. In the normal 16-track-per-pattern mode, all 4 chains can play patterns simultaneously.

The patterns in the chains are independent of each other, and are free to overlap. When you are working with 32-track patterns, chains a and c only are at your disposal.

Tip: there is no connection whatsoever between the chain letters "a"–"d" and the MIDI Output ports "A"–"F" (see Chapter 6: "TRACKS", section 3.1.3 "MIDI Out ports...").

The "arrange cursor" moves down the list when the sequencer is running, showing which entry is the current one.

Whenever the arrange mode is switched on, get into the habit of selecting patterns by clicking their corresponding entry in the arrange list, rather than manually selecting a pattern number in the pattern window.

An entry in the arrange list consists of a "start-bar" *(see section 3)*, **a pattern name** *(see section 2)* **and a pattern number** *(see section 3)*. **This pattern number is always in one of the four chains.**

An entry in the arrange list only ever contains one pattern at a time, never more, and each entry occupies a separate line. This is so each entry in the list can be given a name. If you have two, three or four patterns starting at the same time, they will occupy two, three or four successive lines: it is each entry's start-bar that tells you exactly when it is starting, not necessarily where it is placed within the list.

With the arrange mode switched on ("ARRANGE" "ON" in the "information bar"), which patterns are played when is determined by their entries' start-bars in the arrange list and corresponding pattern number.

Every single entry in the arrange list can be given a set of "pattern parameters". Even if *the same* pattern appears more than once in the arrange list, it can be given a different set of pattern parameters each time:

- **"UPBEAT/CUT"**: you can define a pattern's upbeat or, with "Cut", define where you are going to start within the pattern.

- **"TRANSPOSE"**: the pattern as a whole can be transposed.
- **"LENGTH"**: the length of the entry can be altered.
- **"POSITION"**: shows the entry's start bar, and allows this to be altered.
- **"MUTE"**: each pattern can have a different combination of muted tracks.

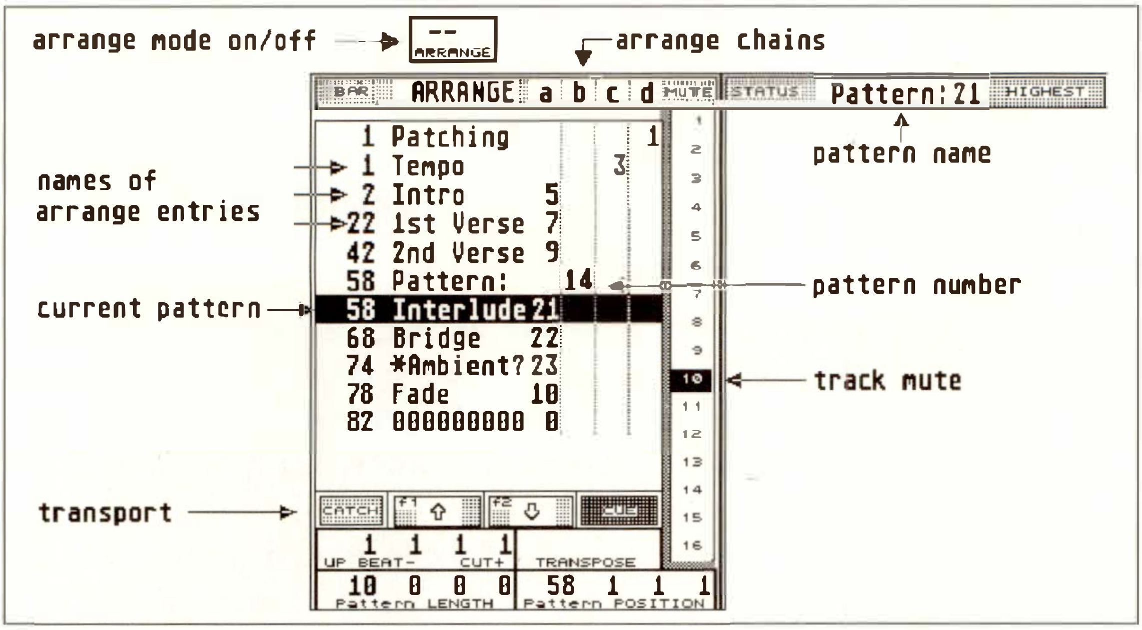
These pattern parameters are, like track parameters, "playback" ones, meaning that they affect data only as it is played through the MIDI outputs: they do not alter data in the computer's RAM. This is why the same pattern can be used more than once in the arrange list and yet still sound quite different each time.

The length of a pattern is determined by the start-bar of the entry that follows it in the same chain. It will stop when the next entry starts in the same chain.

This means that pattern lengths are decided by the succession of entries in a chain.

An entry that has no entry following it in the same chain is of "unlimited" length ("Pattern LENGTH": "no limit" – *see section 6.4).*

Patterns can be started in each of the arrange chains a, b, c and d, which means that up to 4 patterns, each with 16 tracks, can play at the same time.



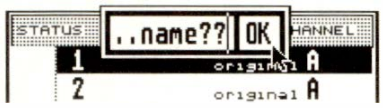
A song, for example, might be structured as follows:

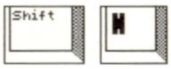
- Chain “a” has a succession of patterns (intro, verse, chorus, etc).
- Chain “b” can contain a parallel solo in one “long” pattern, running alongside some of the entries in chain “a”.
- Chain “c” can contain the drum tracks, recorded live, in one long pattern, running alongside chains “a” and “b”.
- Chain “d” with its 16 tracks is still free, and could be used to record RMG data, or anything you like.

The arrange list, with its names and visual arrangement, is self-documenting. The arrange list alters nothing within the patterns’ data since all the pattern parameters are “playback” parameters, which means you can change your mind at any stage during composing and arranging.

2. Naming entries in the arrange list

There are two ways of naming entries in the arrange list:

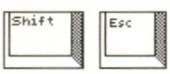




1. **An entry in the arrange list can be automatically force-named by naming the pattern window itself: press 'Shift-N' or double-click where it says "Pattern:XX" above the pattern window.**

   This is the most flexible way of naming an entry because it is the entry's pattern number that determines the name: the name goes where the pattern number goes. You can override this automatic name by using the following method, but once an entry has been named by the following method, you cannot revert to this automatic one.

   So, name your patterns as soon as possible with general names such as "Count", "Intro", "Verse", etc; this will help to show you what is where as your song builds up.



2. **An entry in the arrange list can be named by pressing 'Shift-Esc' with the arrange cursor on it, or double-clicking the entry's name.**

This is not the same as the first method. Here, the *entry as a position in the list* is named, irrespective of the pattern number: changing the pattern number has no effect on the name. It is best only used to override the automatic naming of the first method. For example, where the same pattern appears a second time in the list, you could call it "Verse 2", overriding its original name of "Verse 1".

Use 'Esc', 'Backspace', 'Delete', left and right cursor arrows as usual when typing in the name.

An unnamed entry in the arrange list defaults to the name "Pattern".

3. Start-bar and pattern number

The "start-bar" of an entry in the arrange list is to the left of the name. This marks where the downbeat (the "1 1 1 1") of the pattern is, in the song: in other words, it marks where the entry starts in the arrange list.

The rest of the entry's time position is not shown in the entry line. So, if the start-bar says "8", it means "start this pattern when the Main Bar Counter says 8 1 1 1". If the start position of the entry is a beat etc later, the rest of the time position line can be read (and altered) in the "Pattern POSITION" box *(see section 6.1)* below the arrange list.

The start-bar number depends on the selected time signature (eg 4/4). If the signature is altered after an arrange list is installed, the start-bars will change, and so too will the entries' lengths; however what you hear remains the same. You will need to restore the lengths to their original values *(see Chapter 5: "POSITIONING", section 1.3 "Time signature")*. There are about 1350 bars available in 4/4 time.

Start-bars earlier than 1 are possible (minimum: -9), but, in general, you are advised not to start your music before bar 1: in "MIDI Sync" mode, MIDI protocol dictates that an external MIDI "Start" command must come at the beginning of bar 1, so you would lose whatever lay before it. Even the count-in must start at bar 1, which means you music starting at bar 3 or 5, depending on the length of the count-in.

On the other hand, UNITOR in "SMPTE Sync" mode is able to handle negative start-bars, so long as the "Sync-Reference" "SONG START" position is made early by the same amount *(see Chapter 27: "UNI-TOR, ...").*

If you want the music or count-in to start on the 1, but the list is starting earlier, simply move the whole list later by the necessary bars *(see section 6.4 "Pattern LENGTH" below).*

The pattern number is always to be found in one of the chains a, b, c or d. This determines the chain in which the pattern starts. You can move a pattern across to a different chain by clicking in one of the other chains in the same line.

4. Inserting and deleting entries

4.1 Inserting entries within one chain: single pattern play

To insert entries into the list, you drag them out from each other, like "track copy": drag an entry downwards in the arrange list to copy it (holding it by its name) *(see also section 4.4 "Song Stop").*

Once copied, start-bar, name and pattern number can be changed at any time, so it is irrelevant which entry is used as a "source", unless you wish to copy a particular pattern for repetition etc: the entries are merely instructions for the "arrange list sequencer" to change patterns by remote-control.

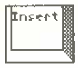
If you drop the entry on top of an existing one, it will be inserted at that position, and the existing one and all the ones after it in the same chain will be moved later by an amount equivalent to the new pattern's length, to make space for it.

Once the new entry is in place, you can change its arrange list length by using its "Pattern LENGTH" box below the list.

If its length is correct, but you want it to start earlier or later, use the previous entry's "Pattern LENGTH" box to shorten or lengthen the previous pattern, for that is what you are saying. Do not touch the new entry's start-bar: you will be able to make it start earlier or later, but then its length will be wrong.

If you drop the entry beyond the last entry in the chain, it will be positioned 4 bars later than the last entry.

4.2 Inserting entries in more than one chain: multi pattern play



If you need a pattern to run at the same time as other patterns, you can insert a new entry in another chain (say, "b"). The way to do this is by using the 'Insert' key.

- **Place the arrange cursor on an existing entry whose start-bar is nearest to where you want a new entry to start in the new chain.**

  Which entry you choose to cursor is not critical but it makes sense to choose one nearest to where you want the new entry to start.

- **Press the 'Insert' key: this makes a copy of the cursored entry and inserts the new copy above it in the list at the same start-bar, but in the next chain along: the arrange cursor simultaneously moves to the new copy.**

It is worth reading that again and doing a few arrange list experiments to ensure you understand that concept! The new entry is inserted so quickly, it is easy to miss what happens.

At this stage, you will have the same entry starting at the same start-bar, but in two chains: a nonsensical situation, since you do not want simultaneous duplicates of your notes! So the next operation after "Insert" is to change the pattern number of the new entry to an empty one, ready to take a recording, and if necessary, change its start-bar to the desired position.

Once it is in a chain, you can move an entry across to a different chain by clicking in one of the other chains in the same cursor line.

Problem: suppose you want a string line to play continuously over the changeover between the verse and bridge patterns in chain "a". The program does not allow a recording to start one pattern and continue in the next without interruption.

Solution: place the string pattern in the next chain. So, place the cursor on the verse pattern in chain "a", press 'Insert' which duplicates the verse in chain "b" as well. Change the duplicate's pattern number to an empty pattern. Done!

4.3 Deleting entries from the arrange list

To delete an entry from the arrange list, drag it into the right half of the screen and release the mouse button; or, press 'Delete' with the arrange cursor on the entry to be deleted.

Deleting an entry has the effect of "telescoping" or shortening the chain that contained the entry by a length equivalent to that of the deleted entry.

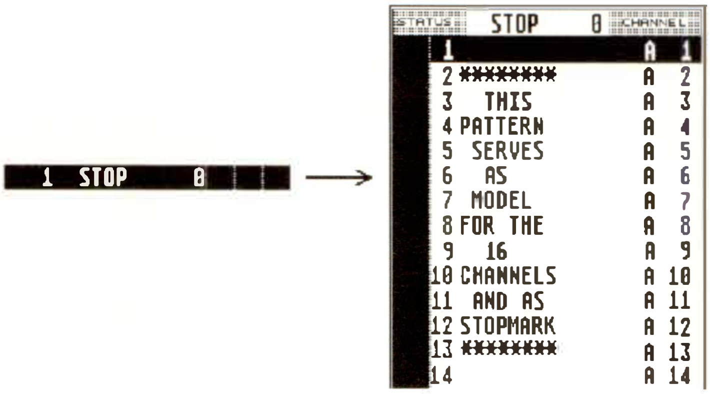
So if you delete an entry that was 4 bars long in chain "a", all the following entries will move earlier by 4 bars in chain "a" to fill the space.

The other chains are not affected by the deletion: so if the other chains are integral to the song, you will have to think about shortening them all by 4 bars at that point to keep their relationships correct.

To delete an entry without moving the entries after it in the same chain, "click" the entry to be deleted across to an empty chain (one with no entries in it), then delete it.

This preserves the chain which contained the entry exactly as it was, except that the entry that was before the deleted one is now longer by a length equivalent to the deleted one.

4.4 Song Stop



Pattern "0" (zero) acts as a Stop command to the sequencer.

Pattern zero's start-bar marks the point at which the sequencer will stop, so insert an entry containing pattern zero at the end of your arrange list. You will notice that pattern zero is already called "STOP", so its name in the arrange list will also be "STOP".

Tip: you may, when building up your arrange list, like to begin by inserting an entry with pattern zero after the initial "default" entry that is always in the list: then drop the other entries (see section 4.1 above) on top of the pattern zero entry. This has the advantage of keeping the copied entries' original lengths.

So, to have a series of 8-bar patterns in a chain (prior to giving them new numbers etc):

- *drag out an entry from the top entry and drop it underneath; the top entry's length defaults to "4 0 0 0", the new one says "No Limit".*
- *change the new entry's number to zero;*
- *place the cursor back on the first entry and change its length to "8 0 0 0" in the "Pattern LENGTH" box below;*

– *drag out more entries from the top one, dropping them on top of the next entry down. This keeps all the lengths at 8 bars, and keeps pattern zero at the end of the list.*

4.5 “32 tracks-per-pattern” mode

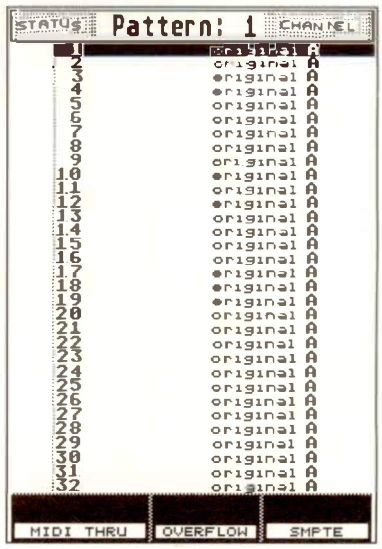
With “32 Track/Pattern” ticked in the “Flags” menu, two patterns each containing 16 tracks become tied together as a “double-pattern”.

The usual 16 tracks per pattern are often not enough, and so the pattern window can display all 32 tracks of this “double-pattern”.

The 32 Tracks/Pattern mode applies to the whole Song. Since the maximum number of simultaneous tracks possible is 64, the arrange mode chains a and c only should be used.

Tip: make your mind up, before starting a song, whether you wish to work in the 4 chains × 16 tracks or 2 chains × 32 tracks mode.

From now on, we will refer to “patterns” and “double-patterns” to distinguish between 16 and 32-track patterns.



In 32 Tracks/Pattern mode, the double-pattern consists of two neighbouring pattern numbers.

Example: patterns 1 and 2, 11 and 12 etc.

The title line of the double-pattern will display the number of the first pattern only.

Important advice: to avoid confusion, please give double-patterns odd (1, 3, 5 etc), not even, numbers.

Example: if double-pattern 1 is inserted in arrange chain a and double-pattern 2 is inserted in chain c, then tracks 17–32 of double-pattern 1 and tracks 1–16 of double-pattern 2 will play simultaneously: they are identical tracks being played twice over MIDI.

You should also be careful when using double-patterns in arrangements that already contain entries in chains b and d. Try to avoid using 32 Tracks/Pattern mode in your "old" songs: it is bound to lead to trouble.

Despite this, if you wish to reorganize such a song, the best method is to name your patterns, save them with "Save PATTERN" and reload them in their new positions into odd-numbered patterns (having deleted the patterns first, of course, using "New Pattern" in the "File" menu, or the delete function in the "Pattern Overview" function ("Options" menu – *see section 15.1*).

NB, to recap: in the arrange list, for every "master" entry you insert, a second "slave" one is inserted at the same start-bar, in the next chain, and whose pattern number is always the master's +1. *This slave entry is not shown in the arrange list*, however the Graphic Arrange Mode (GAM) will display this by widening the beam.

Important: a few pattern functions work on all 32 tracks of a double-pattern, but others affect the half of the pattern in which the track cursor is situated. The latter situation occurs in functions that depend on the MIDI Channel as a distinguishing criterion, eg:

- Demix all tracks
- Mixdown all tracks
- "Screen recording" of realtime mutes.

In addition:

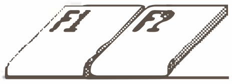
- New Pattern
- Multicopy
- Display parameters (NOTATOR)
- Changing track parameters using the 'Shift' or 'Alternate' keys.

The following functions operate on all 32 tracks:

- Cut & move pattern
- Insert & move pattern
- Copy pattern.

Tip for NOTATOR users: use 32 Tracks/Pattern mode to achieve more staves than are offered by a normal pattern. Switching on Full Score mode allows you access to all the double-pattern's staves, for editing, "Page Previewing" and printing etc.

5. Positioning the arrange list

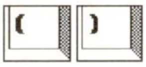


Every entry can be clicked with the mouse.

Function keys 'F1' and 'F2' move the arrange cursor up and down the list without affecting the Main Bar Counter.

Their icons are also on the screen below the arrange list and can be clicked with the mouse.

With the arrange mode on, clicking "START" starts the sequencer from the beginning of the cursored entry. Clicking "STOP" twice resets the Main Bar Counter and sends the arrange cursor back to the first entry.



The '(' and ')' keys in the calculator keypad move the arrange cursor up and down the list, simultaneously loading the left and right locators with the start and end bars of each entry.

These keys allow you to make the sequencer instantly jump from entry to entry while it is playing, and the Main Bar Counter jumps to the start of the selected entry, whereas using the 'F1'/'F2' keys only changes the pattern window display, not what you hear.

5.1 "CATCH" mode

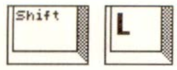
Clicking the "CATCH" icon below the arrange list or pressing 'L' ensures that the arrange cursor scrolls according what the music is doing, ie according to the Main Bar Counter position.

Whenever you start, Catch mode is always automatically enabled.

Clicking anywhere in the arrange list during playback disables Catch mode so that the cursor remains on the current entry even if the music continues.

This allows you to edit etc while the music is playing.

Clicking "CATCH" again makes the cursor catch up with the Main Bar Counter.



"Freeze arrange cursor": pressing 'Shift-L' at any time disables Catch mode. It will remain disabled until you press 'L'.

In some situations, for example where you are working with long patterns in the chains, it is useful to keep the cursor on the entry you are working on, something not normally possible since Catch mode is usually re-enabled with every Start command.

Compare "Freeze arrange cursor" with "Arrange/Pattern Couple" (section 13 below) which allows the arrange cursor to keep moving.

5.2 "CUE"

By keeping the left mouse button depressed on the CUE icon, you can move the arrange cursor up and down the list by sliding the mouse backwards and forwards.

This is a "power" version of the 'F1'/'F2' keys *(see above),* and is used for moving quickly around the display. While the mouse button remains pressed and the mouse pointer looks like a cross, the mouse pointer can stray from the CUE icon.

By keeping the right mouse button depressed on the CUE icon, you start the sequencer from the beginning of the cursored entry; moving the mouse back and forth changes the tempo, which then returns to where it was when you release the mouse button.

This is a very convenient way of starting and stopping CREATOR and NOTATOR, and works in an identical way to the CUE function in the event editor.

5.3 Arrange position markers

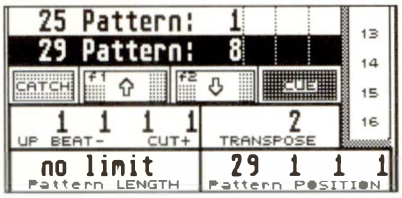
The number keys of the computer's typewriter keypad can be used to store and recall up to ten different arrange cursor positions.

Storing: select the entry and press 'Shift-Alternate-0...9'.

Recalling: 'Alternate-0...9'.

During playback, the sequencer will immediately jump to the recalled entry.

6. Pattern parameters



Each separate entry in the arrange list has a range of parameters, which below (Pattern POSITION, UPBEAT/CUT, TRANSPOSE and LENGTH) and to the right of (MUTE) the arrange list, show the cursored entry's values. They are "playback" parameters that are reversible and non-destructive.

6.1 "Pattern POSITION"

The exact starting position of an entry is displayed in the pattern POSITION box; it can be edited here as well to allow starting times that are not exactly on the bar line.

In practice, the entry's starting time is almost always on the bar, and is determined while you enter it in the arrange list or Graphic Arrange Mode: no need to use the Pattern Position box. However, in the rare case where an entry starts later than the bar, use the Pattern Position value to move the pattern.

Examples:

1. A chorus should start two beats later than the "17 1 1 1" it defaults to: enter "17 3 1 1" in the Pattern Position box.

2. In VITC Sync, a pattern should start exactly on a cue: activate "Position in Frames" *(see section 6.1.2 below)* and click in the Pattern Position box until the cue's SMPTE time is shown.

3. Introducing time signature changes into a song whose arrange list is already established will result in Pattern Position values that are offset from the bar lines: simply go back through the arrange list, re-establishing the correct lengths till the offset values have gone. Do not touch the Pattern Position values themselves *(see also Chapter 5: "POSITIONING", section 1.3 "Time signatures").*

6.1.1 "Position in ms"

"Position in ms" in the "Flags" menu shows any "Pattern POSITION" in terms of hours, minutes, seconds and milliseconds. The current tempo dictates the actual values.

Arrange list entry start times are given in minutes and seconds, but the complete time position to the nearest millisecond must be read under "Pattern POSITION".

Bear in mind that tempo changes in the song are not taken into account.

6.1.2 "Position in frames"

"Position in frames" ("Flags" menu) shows any "Pattern POSITION" in terms of SMPTE hours, minutes, seconds, frames and bits. The current "Sync Reference" including all its tempo changes dictates the actual values *(see also Chapter 27: "UNITOR, ...").*

6.2 "UPBEAT" / "CUT"

"UPBEAT"

NOTATOR/CREATOR will record every note or other event played into it, even those which are played during a count-in (ie before "1 1 1 1"). These notes played before the official first beat of the song are what is known as an "upbeat". If an entry in the arrange list makes no allowance for an upbeat, these "count-in notes" will not be played. This is the usual situation and is roughly equivalent to what most sequencers do.

The "UPBEAT" parameter decides the exact changeover point between an entry and the one before it.

Moving this changeover point does *not* alter the position in time of the pattern.

The default "UPBEAT" value "1 1 1 1" switches between the previous pattern and the current one exactly on the "1 1 1 1" of the current pattern. This represents a normal changeover.

By *reducing* the upbeat value of an entry (eg to "0 3 1 1"), the pattern is given more time before its first beat: the previous entry will stop earlier (in this example, by 2 beats). The current pattern is therefore able to start with its upbeat.

So upbeats are not handled as separate patterns, with all the additional work that entails, but belong within the main pattern, to be used or not as you choose.

Whenever an upbeat for an entry has been allowed for, the "-" sign will appear to the right of its start-bar.

Problem 1: supposing you have had to give a strings track a "DELAY" amount of "-10" to make them sound in time, it means you are making the track play 10 pulses earlier than the rest of the pattern: if the first note of the track was on the pattern's downbeat, ie "1 1 1 1", it is now on "_ 4 4 39".

You will notice that this first note is not playing: this is because the first note is playing before the "1 1 1 1" but no "upbeat" value has been programmed for it.

Solution: give that entry an "upbeat" value equivalent to the position of that early note ("_ 4 4 39"), and it will be heard again.

Problem 2: suppose you have played an upbeat snare introduction to a drum pattern by starting to play during the last two beats of the count-in. This is a relatively large upbeat and means the track is starting on "_ 3 1 1".

Without an "upbeat" value for that entry, that snare intro would not be heard. But if you put one in, you will be stopping the previous pattern early by two whole beats, which means probably cutting off some of its music: not a good idea.

Solution: give that entry its "upbeat" value "_ 3 1 1" and then "click" the entry across to the next free chain: this allows the previous pattern to continue playing to its end, but also allows the current pattern to start playing 2 beats early without stopping any previous pattern. For those 2 beats, the two patterns are playing concurrently.

Note: in this situation, the previous pattern in the original chain now has a greater "Pattern LENGTH" value because the current pattern is out of the way in another chain. If the previous pattern has any "LOOPED" tracks, they will continue playing throughout the new length, which is not desirable as it would spoil the music of the current pattern. So remove any loops and use "Segment Copy" to produce tracks of the exact length required.

Tip: even when an upbeat is not musically necessary, it can make sense to have a slight upbeat value of a few pulses: CREATOR/NOTATOR will sense notes which are still playing at the pattern-changeover point and switch them off with Note Off commands. If the changeover happens, as usual, on the "1 1 1 1", which can be full of MIDI data (old pattern's notes switching off, new pattern's notes starting, Program Change events, etc), there may be perceptible delays in the transmission of the following Note Ons.

By making each pattern's changeover point a little earlier ("UPBEAT" on, say, "0 4 4 40", which is 9/768ths), the previous pattern's notes will be switched off a little earlier. So a few pulses later, the MIDI output is free again for the new pattern's notes.

Upbeat summary: so long as an upbeat is less than about 20 pulses, the fact that the previous pattern stops early is imperceptible. The larger the upbeat value, the more this "early stop" becomes noticeable. Obviously, this depends on the tempo.

"CUT"

The changeover point between two patterns can also be moved later than the "1 1 1 1", in which case you will be cutting into the current pattern and starting, not on its "1 1 1 1" as usual, but on a later bar.

Example: suppose you have an 8-bar pattern, and for the sake of variations, the second time it appears in the list you wish to start it, not on its "1 1 1 1" as usual but on its "5 1 1 1", ie halfway through.

By increasing that entry's "UPBEAT / CUT" parameter to "5 1 1 1", this becomes the new start time of the pattern. The entry is now 4 bars long.

When you "cut" an entry, a "+" appears to the right of its start-bar, and the previous pattern in the chain is lengthened by a corresponding amount.

Note: in many cases, rather than using the same pattern and using "CUT", it is perhaps simpler to make a separate pattern out of it by copying it, cutting off the unwanted bars using "Cut and Move Pattern", and inserting it in the chain as normal.

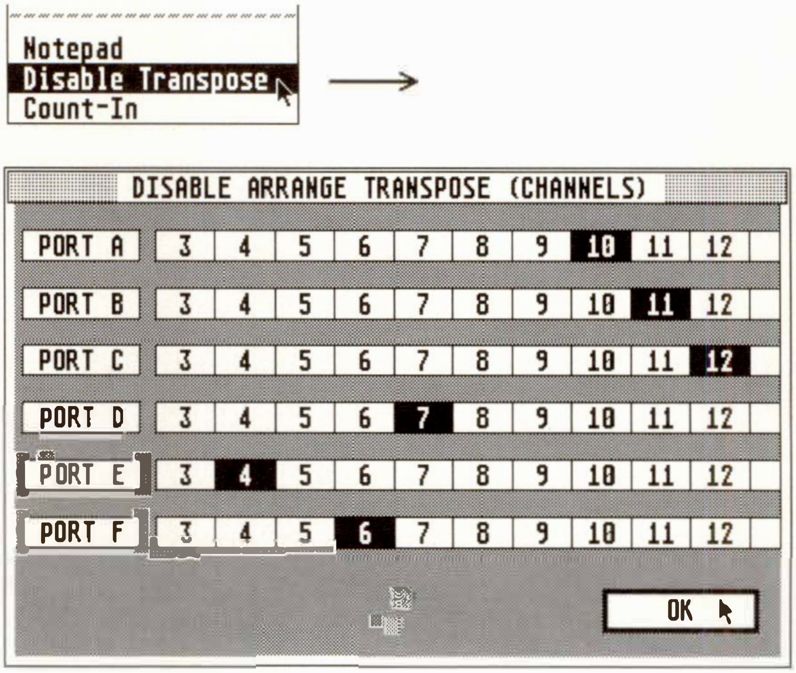
6.3 "Pattern TRANSPOSE"

With the "TRANSPOSE" parameter, the same pattern can be variously transposed throughout the arrange list.

If, for example, the third repeat chorus is to be transposed a semitone up, cursor that entry and enter the value "1" in the "TRANSPOSE" box. That pattern will now be transposed, but only in that entry.

The "Pattern TRANSPOSE" value is added onto any transpose value you may already have in the "TRANSPOSE" track parameter.

6.3.1 “Disable transpose”



When a pattern is transposed, all its tracks are transposed including any drum tracks. This would cause problems of changed instruments where drum machines or samplers worked on a “one drum sound per note” basis.

“Disable Transpose” in the “Options” menu allows you to disallow the arrange transposition on a per-Channel basis. In the window you see 6 ports each with 16 Channels: click the Channels of the instruments that should not be transposed (black = disabled).

6.4 “Pattern LENGTH”

Altering an entry’s “Pattern LENGTH” value (below the arrange list) determines the length of the current entry and moves all entries that follow it in the same chain.

Always **alter entries’ lengths with this parameter,** ***never*** **with each entry’s start-bar.**

"Pattern LENGTH" is a "playback" parameter that does not affect data: a pattern might actually have 20 bars in one of its tracks, but if the entry's length is "4 0 0 0", only the first 4 will be heard. Vice versa, too: if a pattern contains 4 bars of music but its entry is given a "length" value "20 0 0 0", you will have 16 bars' silence after the first 4 bars!

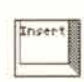
"Pattern LENGTH" will read "No Limit" if the entry is the last one in the chain (this is because there is no entry below it to stop it). Any music in the pattern could carry on for as long as you liked.

"Pattern LENGTH" will read "ZERO!?" if you have two entries in the same chain that have the same start-bar: click on the "Z" of "ZERO" to produce a bar's value.

Problem: suppose you have finished a song which uses chains a, b and c. The time has come to record it to tape, but you forgot to include a count-in of 2 bars at the beginning (do not confuse the need for a "song count-in" at the beginning of a song with the automatic NOTATOR/CREATOR count-in: this automatic count-in is internal and only used to help you record in the sequencer; you will still need a song count-in for the "outside world", other musicians, vocalists, studio engineers etc).

Solution: the start-bar of the top entry in the list will be "1" (chain not relevant).

- Place the arrange cursor on the top entry.
- Press 'Insert' to duplicate the same entry, but in the next chain up.
- Change the new entry's pattern number to a pattern that contains no data.



- Name the entry "count-in" by naming the pattern window.
- Click in chain "a" in the cursor line to make the pattern number move sideways to chain "a".
- In this "count-in" entry's "Pattern LENGTH" box, add 2 bars to whatever the current value is: if it is "ZERO!?", make it "2 0 0 0" (if it were, say, "4 0 0 0" make it "6 0 0 0", etc).
- Click the "count-in" entry across to chain "b" and repeat the operation of adding 2 bars to its length.
- Click the "count-in" entry across to chain "c" and repeat the operation of adding 2 bars to its length.

By adding 2 bars to the count-in entry at the top of each chain, you have pushed back the whole song by 2 bars. It does not matter which chain you leave the count-in bar in. Note how you had to do it to each chain separately since they are independent.

- Lastly, record a count-in in track 1 of the new count-in pattern using a hihat sound (or enter it manually directly into the event editor).

Tip: introducing time signature changes into a song after you have already assembled the arrange list will always result in pattern length changes (producing unexpected start-bar and pattern position values). This is bound to happen (see Chapter 5: "POSITIONING", section 1.3 "Time signatures"), but easy to correct: each time you introduce a time signature, correct the lengths of the entries throughout the list.

Note: it makes sense to introduce time signatures changes before assembling the arrange list.

6.5 Arrange mutes

By clicking in the "MUTE" column, any or all of the 16 tracks of a pattern can be switched off for the duration of that entry in the arrange list: click the desired entry, then click the desired mute boxes (black means muted).

This is not a "Record" function: you should be in "Stop" mode. When you click on an entry in chain "b", the "MUTES" column will show mutes 17-32, in chain "c" it will show 33-48, in chain "d" it will show 49-64: this helps to emphasize that there are up to 64 tracks available.

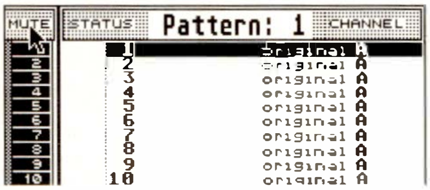
The muting and demuting of tracks allows variations of the same pattern if it is entered more than once in the arrange list. If for example you have a synth solo in the repeated chorus pattern which you only want to hear after the singing has finished, mute its track for every entry where there is singing, then leave it open after that.

Do not confuse these arrange mutes with the "screen recording" mutes: see Chapter 7: "RECORDING", section 1.2.2 "Screen recording".

The two types of mute use the same mute column, so they can interact. You could, for example, start an entry with a track muted, then demute it with one of the "screen recording" demutes halfway through the entry: you would only need a demute for that track, because the entry would always start with it muted.

The mutes can be globally enabled or disabled for up to all 32 tracks in a double-pattern, as follows:

DEMUTE ALL: left-click the word "MUTE" at the top of the mutes column to demute all the tracks in the pattern. A second left-click restores the previous mutes status.



MUTE ALL: right-click the word "MUTE" at the top of the mutes column to mute all the tracks in the pattern. A second right-click restores the previous mutes status.

NB: if the other mouse button is clicked during Demute or Mute All, you lose the previous mutes status.

SOLO MUTE: clicking a track's mute while pressing 'Shift' will mute all the other tracks leaving the clicked one unmuted. Left-clicking the word MUTE removes all the mutes.

MUTE INVERT: clicking the word "MUTE" at the top of the mutes column while pressing 'Alternate' inverts the mute status for that pattern (demuted tracks become muted and vice versa). A second click restores the original status.

These four functions Demute/Mute All, Solo and Invert Mute cannot be recorded in realtime using the Screen recording function.

6.5.1 Arrange mute groups

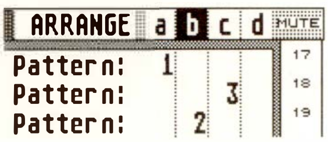
You can store and recall up to ten groups of track mutes and demutes for up to 16 tracks at a time.

To store: **'Shift-Alternate-F1...F10'**

To recall: **'Alternate-F1...F10'.**

These can be used for the arrange mutes, or for "screen recording", since they can be recorded in real-time.

7. Arrange chain "hide"

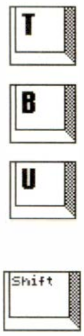


A whole chain can be switched off by clicking the letter a, b, c, d at the top of each chain so its background goes black.

This setting cannot be stored and remains active even when you load a new song (beware!).

8. "Arrange mute-, arrange transpose-, arrange upbeat copy"

Some pattern parameters of the cursored entry can be copied over to the next entry in the arrange list with these keys:



'T': will copy the Transpose parameter

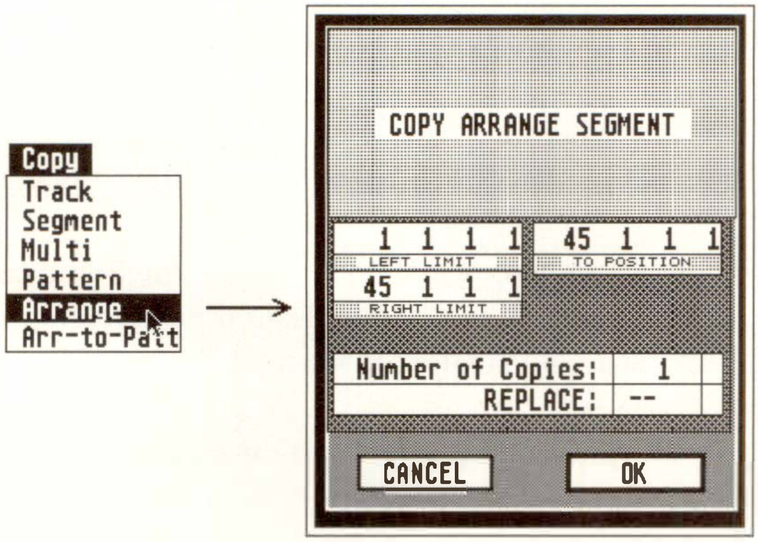
'B': will copy the Upbeat parameter

'U': will copy the Mute parameters

Pressing 'Shift' at the same time as the key will copy the parameter to *all* the following entries in the arrange list.

Example: to transpose the whole arrange list, place the cursor on the top entry, select the "Pattern TRANSPOSE" value and press 'Shift-T'. To remove them all, place the cursor on the top entry, return the transpose value to zero and press 'Shift-T'.

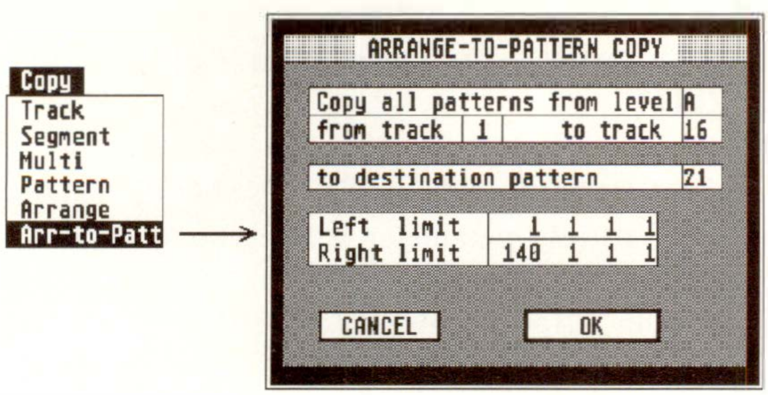
9. "Arrange copy"



You can copy a whole group of entries elsewhere in the arrange list with "Arrange Copy" in the "Copy" menu. It follows the same principle as "Segment Copy" *(Chapter 18, section 3).*

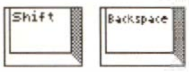
10. "Arrange-to-pattern copy"

"Arrange-to-Pattern" in the "Copy" menu allows you to make one long pattern out of a sequence of entries in one of the arrange chains.



It works rather like an automatic "Multicopy" function on all 16 tracks of the patterns in one chain. The notes and other events of all the "source" patterns in one chain are copied one after the other into the corresponding tracks of the destination pattern.

The "LIMIT" positions determine the portion of the arrange list that will be copied: to copy the whole list, ensure the limits are wide enough. You can also determine which tracks will be included in the copying.



The destination tracks must be empty, though you can "initialize" them first with the desired parameters, including track name ('Shift-Backspace').

If you do not initialize destination tracks, the first pattern's track parameters will be adopted by the destination pattern.

You should therefore check to see how that will affect your different tracks. If necessary, you must use "Normalize" or "Process Data" to alter the events themselves so they do not need the track parameters. If any tracks use the "LOOP" track parameter, use "Segment Copy" to alter the looped segments into actual data.

The arrange mode's pattern parameters are also ignored, with the exception of "Pattern LENGTH".

If any entries have a "Pattern TRANSPOSE" value or any other pattern parameter value, you will need to apply those to the tracks first, then "Normalize" etc them. With arrange mutes (or "screen recording" mutes), the relevant data will have to be deleted before using "Arrange-to-pattern Copy". The exception is the "Pattern LENGTH" value: this will determine the actual length of the pattern that is copied over, so if a length value is "4 0 0 0" but there are 12 bars in the pattern, only the first four will be copied.

The assignment of MIDI Channels to tracks will affect the result.

You must make sure that the same track numbers contain the same MIDI Channels throughout the arrange list before you copy (eg all track 1's = Channel 4, all track 2's = Channel 1 etc).

The program will check the track-to-Channel allocation, and if it detects any mistake, the message "Tracks with different Channels will be accepted / ignored" will appear, giving you the chance to include or reject tracks whose Channels are different from the first pattern's Channels.

Uses for "Arrange-to-pattern Copy": the two main uses are converting an arrange chain into a pattern prior to printing (NOTATOR's printing capability is based on the contents of one pattern), and for preparing a "Standard MIDI File" *(see Chapter 28: "DISK OPERATIONS", section 6).*

11. Deleting the arrange list

"New Arrange" in the "File" menu deletes the whole arrange list, without first issuing a warning: using "UNDO" straight afterwards restores the list if you made a mistake.

12. Recording in the arrange mode

Recording is possible with the arrange mode switched on; there are no limits to what you can do.

In fact you often need to have the arrange mode switched on to be able to hear what is happening in the other chains while you record.

When you are in record mode, the program keeps you in the current track, whatever the song is doing in the arrange list: it can be switching entries as the song progresses (you will see the arrange cursor move up the entries in the list), but you are quite safe: you will stay in your record track. The recording does *not* jump from entry to entry with the arrange cursor.

When you go into record mode with the arrange mode on, the count-in means the program will start one bar back (this depends on the count-in) so that you will hear what is in the song as well as the normal metronome "click".

It is important to ensure you are in the right *track* before entering record mode: so long as that is correct when you enter record mode, then even if the arrange cursor is in the wrong place, no harm will come of it.

In the event list, the time positions of recorded notes and other events are always related to the "1 1 1 1" of the current pattern, not to the "1 1 1 1" of the arrange list.

If you record a track in a pattern which has been entered into the arrange list at various points, the piece which you have recorded will, of course, also play at those various points.

If you find, once you have recorded a track, that the notes are not where you expect them to be, use the event list's "Insert Mode" to move them.

The length of a pattern is as long as its longest track. In practice, though, the length is determined by the "Pattern LENGTH" value: so even if you recorded 20 bars of solo while the song was playing, if the entry's "Pattern LENGTH" value is "8 0 0 0", the arrange list will play back the first eight bars only.

Simple recording:

You can approach the recording of a song in one of two ways. We will assume that a pattern represents a song section (verse, chorus etc):

1. Record each pattern separately then assemble them afterwards in the arrange list. This is a rather inflexible way to work and can produce a rather disjointed result. You run into problems when you need more simultaneous tracks.

or

2. Assemble a chain of entries containing as-yet empty patterns. Enter the desired pattern numbers and lengths (if known). You now have a "dummy song" ready to record notes which you may like to save as part of your "AUTOLOAD.SON" *(see Chapter 28, section 2.3)* for future work.

Now place the arrange cursor on the desired entry, place the track cursor on the desired track and click "RECORD"; you hear the last bar of the previous entry (if it contains any music) as count-in (as well as the metronome), then start recording the music. If you are in the middle of recording an 8-bar bassline, and you previously set the pattern's length to "4 0 0 0" in the "Pattern LENGTH" box, don't worry: the arrange list will scroll to the next entry but you can continue recording the bassline. When you have finished, you will need to increase the length to "8 0 0 0" to be able to hear it all.

Remember: all the pattern parameters such as "Pattern LENGTH" are "playback" parameters that can be altered at any time without affecting the data.

13. "Global Positions"

"Global Positions" in the "Edit" menu affects the display of time positions in the event editor and some functions.

With the arrange mode on, when "Global Positions" is enabled, events' time positions will be shown relative to the beginning of the arrange list.

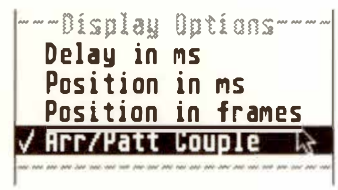
Normally, they are shown relative to the beginning of the pattern.

For "Global Positions" to work properly, ensure the arrange cursor is on the entry whose pattern you wish to inspect.

Example: suppose an event is at "1 1 1 1" in a track. If the pattern is placed in an arrange entry that starts at bar 9, then "Global Positions" will show the event's absolute position in the song: "9 1 1 1".

The "limit positions" that belong to event-altering functions ("Process Data", "Transform" etc) and the copy functions ("Segment Copy" etc) will be relative to the arrange list's beginning if "Global Positions" is enabled and the arrange mode is on.

14. "Arrange/pattern couple"



Any change in pattern number in the arrange list will automatically display that pattern in the pattern window. This display-coupling is automatically interrupted when recording with the arrange mode on, so that the pattern does not change while you are in the middle of recording.

The arrange cursor will continue moving down the list while in record mode.

Switching off "Arr/Patt Couple" in the "Flags" menu disables this display-coupling. This has no effect on what you hear, only on what is displayed.

It is normally not necessary to disable "Arr/Patt Couple". It sometimes is:

Problem 1: chain "a" consists of many short entries, chain "b" contains one entry at the top. You wish to experiment with different track velocities in the chain "b" entry, but whenever you click "START", the arrange cursor moves down the list and updates the pattern window with the chain "a" entries.

Solution: to concentrate on this pattern while the song is playing, disable "Arr/Patt Couple" and manually select the pattern in the pattern window by clicking the pattern window number.

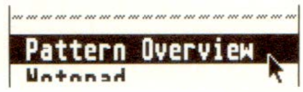
Problem 2: in SMPTE or MIDI Sync modes, the tape position determines the sequencer position. The sequencer position determines the arrange cursor position, which in turn determines which pattern will be displayed.

In a studio, you normally have no control over exactly where the studio engineer starts the tape. But you wish to record in a specific pattern with CREATOR/ NOTATOR synchronized to tape.

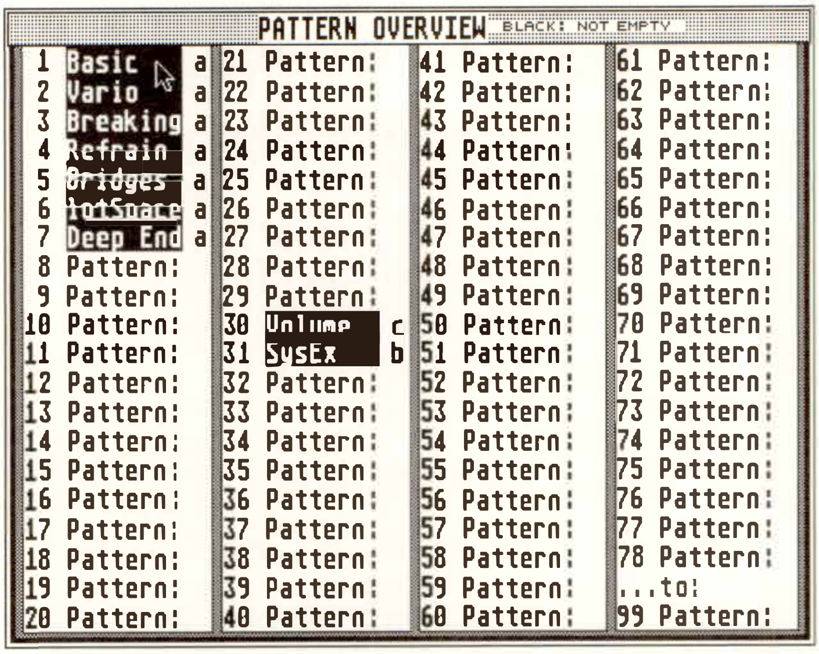
Solution: disable "Arr/Patt Couple" and choose the pattern manually (by clicking the pattern window number) so that it does not matter where the tape starts, you are already in the correct pattern and track. All you need to do just before the right point is click "DROP" to enter record mode and start playing.

Compare "Arr/Patt Couple" with "Freeze arrange cursor" (see section 5.2 "CUE" above).

15. "Pattern overview"



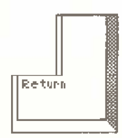
The "Pattern overview" window in the "Options" menu displays the status of all 99 patterns at once (not Pattern zero).



For each pattern, it shows:

- The pattern's name, where it has been named at the top of the pattern window.
- Whether it contains recorded tracks (pattern name is shaded).
- Whether it is included in the arrange list, by showing its chain letter.
- Whether it is included in more than one chain, by showing a tick where the chain letter would normally be shown.

To exit from the window, press 'Return'.



Clicking a pattern exits the window and displays that pattern in the pattern window.

Pressing 'Shift' while clicking a pattern exits the window and forces that pattern number onto the cursored entry in the arrange list. If the entry is not yet named or has adopted the name of the pattern window *(see section 2 above)*, then the new pattern's name will be forced onto it. If the entry itself has a name via the 'Shift-Esc' method, that name will continue to be displayed.

15.1 Deleting within Pattern Overview

You may easily delete patterns from within the Pattern Overview window.

Operation:

- Open Pattern Overview by pressing 'Alternate-O'
- Right-click the pattern that needs deleting.
- The display returns to the main page and a dialog box asks whether you wish to delete that pattern.
- Click OK or press 'Return': the contents of the pattern are deleted and you return automatically to Pattern Overview for any more deleting etc.

16. Graphic Arrange Mode (GAM)

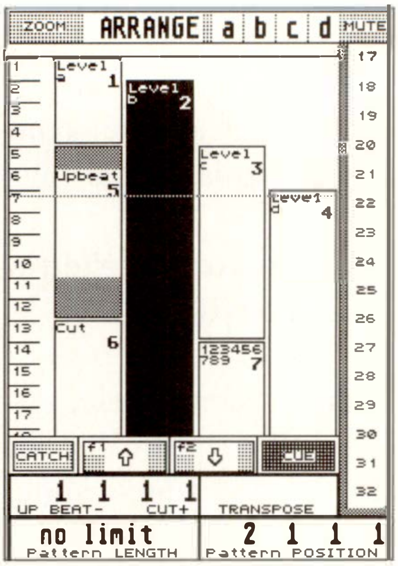
16.1 The basics

The arrangement in the arrange window can also be displayed graphically in the form of beams. Switching is possible between the arrange list and GAM displays without any effect on the musical flow.

The GAM allows an enhanced interaction between user and arrangement, both in the creation and editing of the arrangement, as well as giving a more readable feedback over the structure.

16.2 Activating the GAM

Click the word "ARRANGE" at the top of the arrange window or press 'K' to toggle between the arrange list and the GAM.



16.3 Structure

The above display shows how the arrange entries are in the form of vertical beams. Up to four beams can be entered side-by-side, representing chains a to d.

Inside each beam at the top are the name and number of the pattern assigned to that beam.

Any Upbeats or Cuts are shown as grey areas. The grey area within a beam helps distinguish between Upbeats and Cuts and shows to which entry these belong.

Down the lefthand edge of the GAM is the "bar ruler" which shows where the beams are, relative to the song.

The dotted "Song Position Line" (SPL) that moves down the GAM shows the current position of the playback when "Catch" is active.

The "current entry" beam is displayed in reverse video, as is a "selected" beam that you have clicked.

16.4 Zoom

When the GAM is active, the panel to the left of the word ARRANGE displays ZOOM: clicking the left/right mouse buttons zooms in/out of the GAM. Keeping a mouse button depressed accelerates the zooming.

NB: as a rule, avoid the extreme zoom factors where you cannot see every bar in the bar ruler.

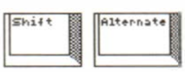
16.5 Creating GAM entries

Entry beams are created by right-clicking at the desired bar in the desired chain.

NB: if an entry already starts there, you will be warned by a dialog box "Do you really want to duplicate this entry?". Press cancel: duplicating an entry does not make sense.

Entries will always be entered at the nearest exact bar. "Pattern POSITION" can then be used should you wish to offset this.

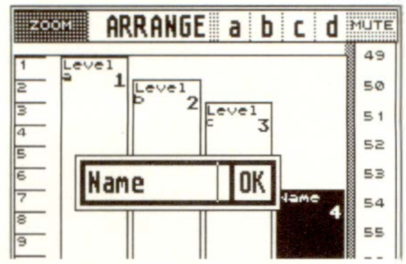
16.6 Deleting GAM entries



An entry beam is deleted by clicking it while keeping 'Shift-Alternate' pressed, or by dragging it to the right, out of the arrange window, and releasing it. These methods simply lengthen the previous beam (entry); they keep the following beams in situ.

Alternatively, pressing the 'Delete' key deletes the beam and moves all the following beams in that chain earlier to fill the void left by the deleted beam.

16.7 Defining pattern numbers and names

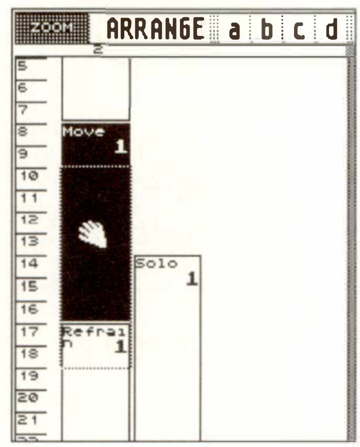


When creating a beam (see above) in the GAM, it takes the pattern number and name of the current pattern in the pattern window.

To change a beam's pattern number, click the little number at the top of the beam.

As in the arrange list, double-clicking the name (click the start of the name) in the beam allows a name different from that of the pattern window to be typed in.

16.8 Moving GAM entries

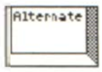


Dragging a beam, keeping the mouse pointer away from the beam's top right and bottom right corners, produces the familiar little "dragging hand". Dragging the beam up/down alters its start bar but keeps its end position in situ, so its length will change accordingly. Of course, the length of a preceding beam, if there is one, will alter accordingly as well.

Dragging a beam horizontally moves it to another chain. Its final length will depend on whether any beams are already present in the destination chain: if not, it will acquire a "No Limit" length; if there are, the first beam that follows the new entry will limit the new beam's length.

The length of the entry that preceded the moved beam in the old chain will increase to fill the void left by the moved beam.

NB: very short entries should be dragged by their lefthand top corners. Moving the mouse pointer too far right may change the pattern number or select the length-change feature. If necessary, alter the zoom factor.



Without changing its length, an entry can be moved to a new position if ‘Alternate’ is pressed while dragging it.

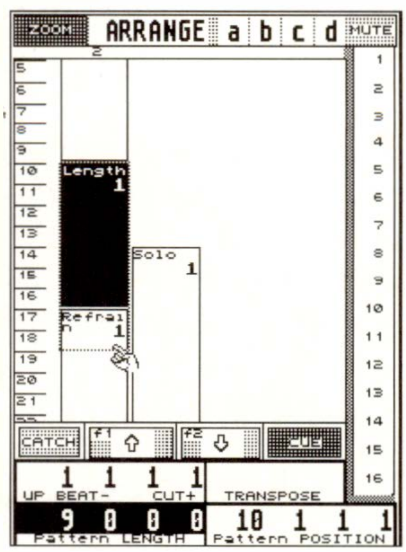
This moves all the other entries that follow it to ensure that its length does not change.

If you move an entry beyond the lower or upper limits of the arrange window, the display will automatically scroll in that direction, allowing the whole operation to be mouse-driven.

16.9 Copying GAM entries

Dragging a beam to a new position while pressing ‘Shift’ copies it.

If you copy an entry beyond the lower or upper limits of the arrange window, the display will automatically scroll in that direction, allowing the whole operation to be mouse-driven.



16.10 Altering the length of GAM entries

Dragging a beam by its lower righthand corner alters its length.

NB: during this operation, the “Pattern LENGTH” panel darkens to confirm you are length-altering.

The effect on the following entries is to move them all earlier/later according to the new length of the beam.

16.11 GAM Upbeat/Cut

Although these parameters must be numerically entered as usual in the Upbeat/Cut panel, they are graphically displayed as grey areas within the beam.

16.12 Moving the GAM display

Click the arrow icons below the arrange window or press 'F1' or 'F2' to alter the viewing section of the GAM. Alternatively left-click and hold the CUE icon and move the mouse back and forth.

This will not affect playback and may be done while the sequencer is running.

Tip: in certain situations, such as when dealing with very long arrangements, it may be easier to take advantage of the easy switching between the GAM and arrange list and switch to the arrange list to scroll. Once you have found the desired entry in the list, click it, switch on the GAM, and the selected beam will be ready for you.

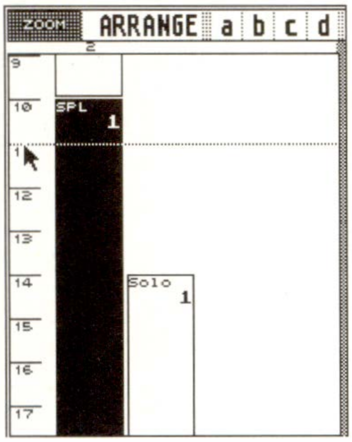
Normally, when you click inside the GAM, the SPL will disappear and the display will freeze to allow you to work on the selected pattern without fear of it scrolling on. However:

Pressing 'Shift' in combination with the left/right cursor keys will move the GAM cursor from chain to chain, and activate "Catch" at the same time, to allow the SPL to continue scrolling while you are viewing in Play mode.

16.13 Positioning with the SPL

All the usual positioning commands, eg starting from a particular entry, jumping between entries using the bracket keys (which also loads the locators) etc, are available.

Dragging the Song Position Line or clicking in the bar ruler offers more possibilities.



The SPL can be reactivated at any time by using the "Catch" function (press 'L').

Drag the SPL at the point where it touches the bar ruler down the lefthand edge of the arrange window, using the left mouse button. This moves the Main Bar Counter bar-by-bar. Alternatively click anywhere in the bar ruler and the SPL will jump there.

NB: dragging the SPL beyond the lower or upper limits of the arrange window automatically makes the GAM scroll in that direction. Additionally pressing the right mouse button when the window limit has been reached speeds up the playback.

In Stop mode, clicking in the bar ruler positions the SPL at the nearest bar: press "Continue" to continue the playback from that point. Clicking in the bar ruler during playback makes the sequence jump to and continue playing from that point.

16.13.1 Locator loading from the GAM

The SPL can be used for easy loading of locators for, say, the Cycle mode.

Left-click in the bar ruler keeping 'Shift' pressed to load the left locator. Right-click in the bar ruler keeping 'Shift' pressed to load the right locator.

16.13.2 GAM scrub mode

The GAM allows a certain amount of audio "scrubbing" to help, for instance, find a problem in the music.

Operation:

Using the right mouse button, click and drag anywhere in the bar ruler, moving up and down. You will hear the MIDI playback in both directions, and the SPL jumps to where the mouse pointer should be.

Example: use this scrub mode as a simple way to find a bad note (ARRANGE is ON, the sequencer is stopped): now right-click and hold (don't move the mouse!) a position just before the bad note. This starts the sequencer.

As soon as you hear the note, release the mouse button.

Enter the event editor of the track with the bad note and click "Catch" or press 'L'. The cursor should be highlighting the bad note or one very close to it. The search is over!

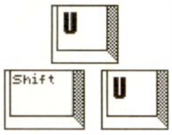
NB: scrubbing also works when the sequencer is already running. Playback continues from the point where you released the mouse button.

The zoom factor affects the smoothness of the scrubbing.

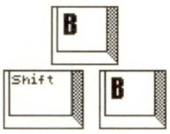
"TRUE PROGRAM" is deactivated during scrubbing to prevent Program Change commands clogging up the MIDI bus or confusing synthesizers.. To hear Program Changes, use the left mouse button when clicking in the bar ruler.

16.14 Chain-specific functions

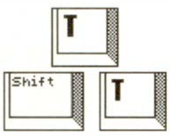
The following functions apply to the current chain only when the GAM is active:



Arrange mute Copy: 'U' and 'Shift-U'



Upbeat/Cut Copy: 'B' and 'Shift-B'



Transpose Copy: 'T' and 'Shift-T'

'(' and ')' in calculator keypad: jumps to the next entry in the chain and loads the locators.

Tip: to apply the above functions to all the entries whatever chain they are in, switch to the arrange list.

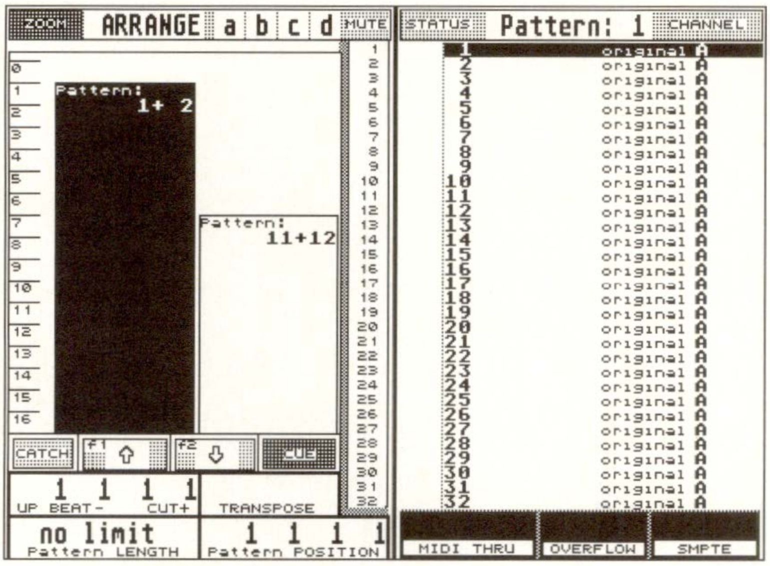
After selecting an entry, the arrange cursor remains on that entry until another entry is selected.

In Play mode when "Catch" is active, only those patterns of the current chain will be displayed in the pattern window.

Use 'Shift' with the cursor keys to view other chains: this function includes the "Catch" command so that the SPL continues to scroll.

In the GAM, entries relating to double-patterns can only be entered in chains a and c. The beams become double-width and the pattern name/number is shown at the top of the beam, including the number of the "second half" of the double-pattern.

16.15 Advice re double-pattern entries



The above display shows that patterns 2 and 12 are included within patterns 1 and 11 respectively. The pattern window itself will only show the number of the first pattern.

16.16 Arrange SAVE/LOAD

The arrangement can be separately saved to and loaded from disk from within the "File" menu.

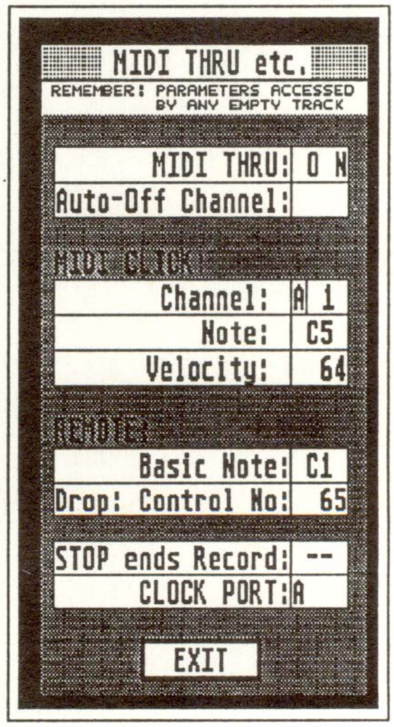
21. Overall Settings

21. Overall Settings

1. MIDI Thru

The MIDI Thru function's job is to immediately pass on data that arrives at the MIDI Input to a MIDI Output and on to a MIDI instrument. This makes it possible to simultaneously hear the instrument that you want to record with, without having to wait for playback.

Click "MIDI Thru" ("MIDI" menu) or click the "MIDI THRU" box below the pattern window to open the MIDI Thru window. Its top line switches the MIDI Thru function on/off. Normally, leave it on.



The second line down controls the "Auto-Off Channel" function.

If a Channel 1-16 is inserted here, the MIDI Thru function will be switched off for that MIDI Channel only. This solves the problem experienced by synthesizers with no "MIDI Local" function which are being used as master keyboard: without "Auto-Off Channel", their voices would be triggered twice, once internally by the instrument's keyboard, and again via MIDI, leading to a loss of polyphony and "phased" sounds. For these keyboards, set "Auto-Off Channel" to match their receive Channel.

Tip: switch your master keyboard's "MIDI Local" function off, and switch "Auto-Off Channel" to "blank", then save that setting with the "AUTO-LOAD.SON" (see Chapter 28: "DISK OPERATIONS", section 2.3).

The track parameters of any <u>empty</u> track are used by CREATOR/NOTATOR's MIDI Thru function, and so affect what you are playing live *(see also Chapter 6: "TRACKS", section 1.2).*

For example, to re-direct incoming MIDI data to Channel 3 on port A, select "A 3" in an empty track's "CHANNEL" track parameter: the master keyboard's transmit Channel is irrelevant.

Other track parameters (eg "TRANSPOSE") also affect your live playing *(see Chapter 6: "TRACKS", section 3).*

A recorded/initialized track is removed from the MIDI Thru function: placing the track cursor on it does not automatically access its track parameters ("CHANNEL" etc):

Place the track cursor on the recorded track and press '#' (USA '\') to auto-copy its parameters to all the empty tracks, thereby dictating the MIDI Thru function.

The MIDI Thru function is one of CREATOR/NOTATOR's realtime functions *(see Chapter 23: "REALTIME MIDI FUNCTIONS").*

The "MIDI THRU" box below the pattern window shows the velocity of the notes you are playing live in the form of a horizontal beam, if the MIDI Thru function is switched on.

2. MIDI Click in Record and Playback

The metronome during Record and Punch modes (including count-in) can be heard by turning up the Atari monitor's loudspeaker. It is often too quiet for certain situations. It is therefore possible to send the metronome to any MIDI instrument as a short note: the "MIDI Click" *(see also Chapter 7: "RECORDING", section 2).*

The MIDI Click settings are in the "MIDI Thru" window ("MIDI" menu).

You may select the MIDI Out port (A-F), the MIDI Channel within the port, the pitch and the velocity of the note.

The MIDI Click may be switched on/off with "MIDI Click" ("MIDI" menu).

"Play Click" ("Flags" menu) switches the MIDI Click on/off when in Playback mode; it defaults to "off".

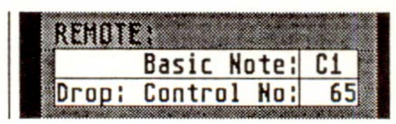
3. Key Remote

The "REMOTE" settings in the "MIDI Thru" window ("MIDI" menu) affect the MIDI "transport remote control" of some CREATOR/NOTATOR's functions ***(see also Chapter 5: "POSITIONING", section 4.2 "Transport remote via MIDI").***

Here, select the "basic note" of the keyboard section being used as the remote controller: this note (default "C1") is the "START" remote control. The other functions are spread over the following 10 semitones.

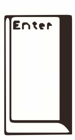
In addition, the "DROP" function (in and out of Record mode) can be controlled via a footswitch (eg MIDI Controller 65 "Portamento").

"Key Remote" ("Flags" menu) activates these settings.



4. "STOP ends Record"

"STOP ends Record" in the "MIDI Thru" window ("MIDI" menu) determines whether a Stop command received while CREATOR/NOTATOR are in "MIDI Sync" or "SMPTE Sync" modes should end a recording as well.



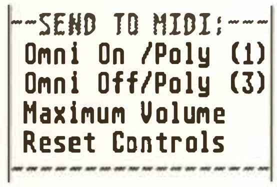
If "STOP ends Record" is switched off, the tape can be started, stopped and spooled and the sequencer stays in record mode. If the same segment of tape is repeated, existing notes in the sequencer's record track will be heard, and any new notes you play will be merged in. If track parameters "QUANTIZE" or "GROOVE" are being used, time correction will occur whenever and wherever the tape is started. Clicking "STOP" or pressing 'Enter' will end the recording.

5. MIDI Clock output port

"CLOCK PORT" in the "MIDI Thru" window ("MIDI" menu) determines the MIDI Output port (A-F) through which the MIDI Clock data is sent (only one port at a time).

6. MIDI Mode messages

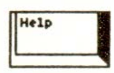
The "MIDI" menu allows various MIDI messages to be sent to the MIDI devices connected to CREATOR/NOTATOR. Not all devices understand these messages (refer to their MIDI implementation charts).



Omni On/POLY (I): click this to switch the receiving devices to "Omni On" (MIDI mode 1). In this mode, a device reacts to every Channel it receives. This is usually never used in a normal MIDI system.

Omni Off/POLY (3): click this to switch the receiving devices to "Omni Off" (MIDI mode 3). Here, devices or voices with different Channels react only to data sent on corresponding Channels. This is the standard mode used in a multi-device MIDI system.

Maximum Volume: switches all devices to maximum Volume (Controller 7, value "127"). Use this after, say, an RMG fade out. If ever a device is strangely quiet for no apparant reason, try clicking this option. "Maximum Volume" is not part of the general "Reset Controls" command.

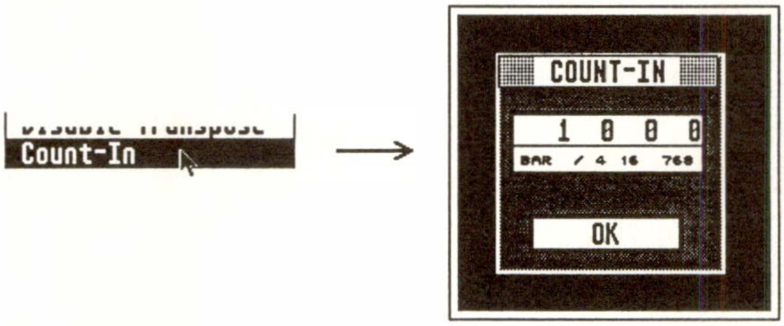


Reset Controls: resets the receiving devices' Pitch Bend, Modulation Wheel, Channel Pressure, Sustain footswitch (MIDI Controller 64) etc, and sends an "All Notes Off" message to stop any droning note (it is often quicker to use the 'Help' key or to press the "Stop" key ('Enter') twice).

7. Count-in

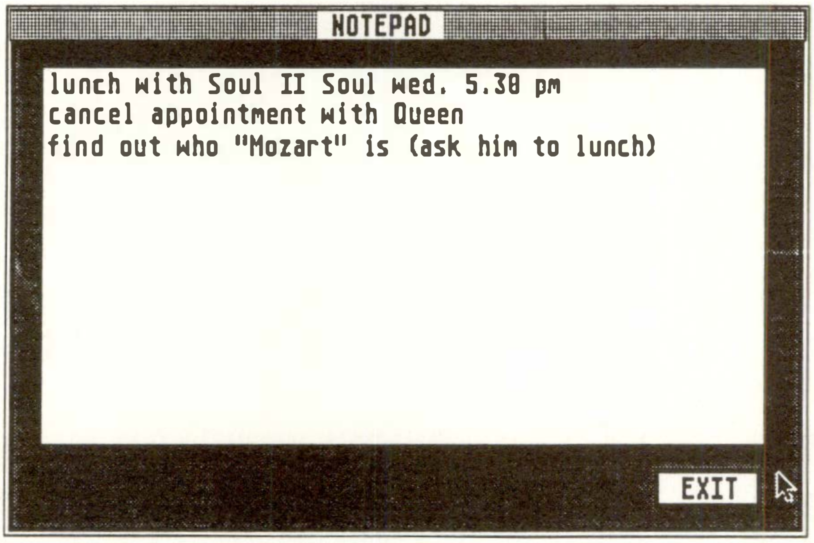
The length of the recording count-in can be altered under "Count-In" ("Options" menu) *(see also Chapter 7: "RECORDING", section 2)*. The display is expressed in the usual bar, beat etc form, eg "1 0 0 0" means exactly one bar's count-in. Store the length in the "AUTOLOAD.SON" *(Chapter 28: "DISK OPERATIONS", section 2.3)*.

You may record during the count-in *(see also Chapter 20: "ARRANGE MODE", section 6.2)*.



8. Notepad

Press 'Alternate-N', click "Notepad" ("Options" menu) or right-click the "OVERFLOW" box below the pattern window to open the Notepad. The note-pad is saved to disk as part of a song, and can be transferred between songs via "Load System" *(Chapter 28: "DISK OPERATIONS", section 3).*

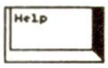


Use it to make notes about your song etc. 'Esc' de-letes a line.

8.1 Auto-open Notepad

Type an exclamation mark ! in the top left corner of the notepad, then save the notepad with a song: this will automatically open the notepad next time the song is loaded.

9."MIDI Reset on Single Stop"



Keystroke 'Shift-Help' allows a single Stop command to send the MIDI system reset commands (normally, a double Stop is needed). Useful in "MIDI" or "SMPTE" Sync modes where some older synthesizers can have droning notes when the tape stops: it saves having always to press the 'Help' key.

10. Keystroke: 'Help'

The 'Help' key resets the MIDI instruments and stops droning notes *(see section 6 above).*

11. RS-232 and "Edit message" reset

Keystroke 'Shift-J' resets the RS-232 port at the back of the computer (where you attach EX-PORT). It also restores the "Do you want to create a new track?" message if you once clicked the "No message" option when entering an empty track's event editor.

22. Realtime MIDI Generator (RMG)

22. Realtime MIDI Generator (RMG)

1. The basics

The "Realtime MIDI Generator", called the "RMG" from now on, is a kind of multi-purpose automated MIDI mixer with a large number of different control elements allowing you to generate any type of MIDI data.

Each time you move the "faders", MIDI events are generated, similar to what happens when you move a synth's modulation wheel.

The RMG is just a tool for generating MIDI events, not an independent sequencer in its own right. In Record mode, the data that is generated by the fader movements is recorded in the current track. In Playback mode, its faders move automatically because the RMG constantly monitors the MIDI output of the sequencer and reacts to certain types of MIDI event.

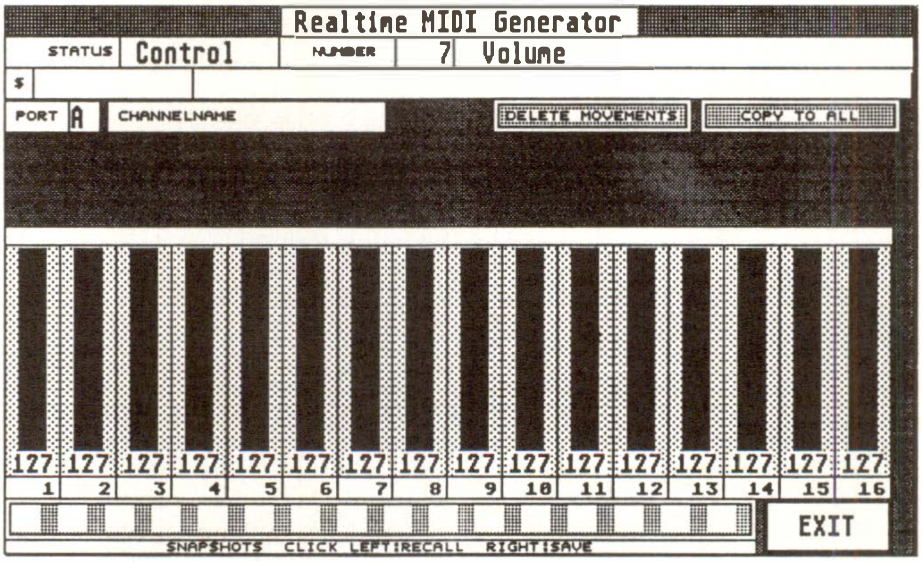
Note: for reasons of memory conservation, the "moving faders" feature applies only to Control 7, Program and P_USER 5 to 12 events. All other types of event will be recorded and played back as normal, but without moving faders.

To save particular combinations of values for another day, which have been generated by the RMG, data must have been recorded in a track which can then be saved with the current song. MIDI data cannot be saved "in" the RMG.

To save particular fader positions, see "Snapshots" *(section 7)*.

The RMG is designed specially to produce flowing, dynamic chains of events of the kind required to change volume or sound characteristics. By using a single multitimbral synthesizer you could, in theory, work without any other audio components apart from an amplifier and speaker.

Note: the only way to get the data in the track back into the synthesizer, is to Start CREATOR or NOTATOR so that the track plays the data back.



2. RMG components

Enter the RMG by clicking the "RMG" box (to the left of the "EDIT" box on the main page), or press 'M'.

You will see 16 beam-shaped vertical fader controls. Above each of the faders you will see the first four characters of the MIDI Channel name.

If you click one of the faders, the full MIDI Channel name will appear in the "CHANNELNAME" box (provided you have already named it on the main page).

The fader numbers 1-16 correspond to MIDI Channels 1-16, not track numbers!; for example, fader 3 will transmit on Channel 3.

The MIDI output port is determined in the "PORT" box to the left of "CHANNELNAME".

To be able to send on all 16 Channels at once, the MIDI Thru function *(see Chapter 21: "OVERALL SETTINGS", section 1)* **is automatically switched to "original" CHANNEL on entering the RMG. Your master keyboard's transmit Channel will not be redirected to another Channel.**

If you want to be able to play live on a particular instrument's Channel while in the RMG, you must alter your master keyboard's transmit Channel.

3. Generating various types of event

By selecting a status in the top line of the RMG, different types of MIDI event can be generated.

The "STATUS" box allows you to select any MIDI status except for "NOTE", plus "P_USER" events 5 to 12.

The "P_USER" status allows you to freely define MIDI messages (see Chapter 8: "TYPES OF EVENT").

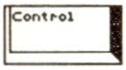
The "NUMBER" box to the right of "STATUS" determines its "first data byte" *(see Chapters 8: "TYPES OF EVENT" and 9: "EVENT EDITOR").* The names of Controller events are displayed with their numbers, as in the event list in the event editor; for polyphonic Aftertouch (Poly Pressure), the note number is shown.

The "second data byte" value, as with Hyper Edit, is determined by moving the fader. The only exceptions are "Program" and "C-Press", where the fader transmits the "first data byte".

STATUS	"NUMBER"	FADER
Poly Pressure	Note number	Pressure intensity
Control Change	Control Number	Control amount
Program Change	(no meaning)	Program number
Channel Pressure	(no meaning)	Pressure intensity
Pitch Wheel	(no meaning)	Pitch bend amount
P_USER 5 + 9	(user-definable)	definable message
P_USER 6 + 10	(user-definable)	definable message
P_USER 7 + 11	(user-definable)	definable message
P_USER 8 + 12	(user-definable)	definable message

Note: the "Program" status represents a special case. Although all program changes produced by moving the fader during recording are sent to the MIDI device, CREATOR/NOTATOR will only record the fader's last value (when you release the mouse button). This makes it possible to find the right sounds while hearing them change, without recording the search process itself.

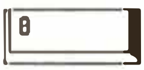
4. Using the faders



The RMG faders can be moved using either mouse button.

If you point at a fader and hold the 'Control' key, moving the mouse controls the fader movement without restricting you to moving within the fader's own box. To zero a fader, click either of the mouse buttons while holding 'Control'.

The numeric value which appears beneath the faders can be increased or decreased by direct clicking with the left/right mouse buttons. This changes the value evenly.



You can also enter specific values using the computer's typewriter keypad number keys (click the fader first). Not using the calculator keypad to do this ensures no start command is given via the large '0' key.

4.1 Recording with the RMG

When you click the CREATOR/NOTATOR "RECORD" control, you are able to record the MIDI data that is generated by the faders into the current track.

Please note: the data is not recorded in the RMG itself. You are using the RMG as a tool to record data into the sequencer's current track.

If the track is empty, recording takes place as normal, with the added feature that the track is switched to "original" "CHANNEL" on the main page.

If the track already contains data, clicking "RECORD" produces the following dialog box message: "Record will delete old track: RECORD/ DUB?". If you click the "RECORD" box, this completely deletes the current track before starting the recording; if "DUB" is clicked, this keeps the current data and merges the new data in with it.

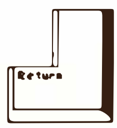
Use "DUB" after using "DELETE MOVEMENTS" if you wish to correct a Channel's data.

Beware that generating more events on a certain Channel can lead to "fader position conflicts", if existing data already exists for that Channel: this is why "repairs" to a Channel must be preceded by a deletion *(see "DELETE MOVEMENTS" below).*

4.2 "DELETE MOVEMENTS"

If the MIDI data relating to the movements of several faders is recorded in one track, and a Channel's data need correcting, it is necessary to first delete the bad data before recording the new.

"DELETE MOVEMENTS" deletes the data of one Channel, either throughout the track, or only while the mouse button is held:



Deleting a Channel throughout a track: click the fader whose data needs deleting, then click the "DELETE MOVEMENTS" icon. A dialog box appears in which you click "DELETE" or press 'Return': this deletes all the events in the current track, whose events had been generated by the clicked fader.

Deleting some of the Channel's events: to delete only some of the Channel's events, click the fader, start the sequencer and right-click and hold the "DELETE MOVEMENTS" icon at the desired point: the "busy bee" appears. Release the mouse button when you wish to stop erasing, and a dialog box appears in which you click "DELETE".

Note: "DELETE MOVEMENTS" deletes data by status and "first data byte", so that clicking the icon with, say, "Control 7" will only delete volume events from a track that contains for instance a mixture of "CONTROL 7" events and P_USER 5 events.

5. RMG Example: Volume (Control 7)

Suppose you want to vary the volume of a multitimbral expander.

The RMG defaults to status "CONTROL" with "NUMBER" "7" (Control 7 = MIDI Volume). Install this setting if necessary.

- Select an empty track and ensure "CYCLE" is off.
- Click "RECORD" and drag the appropriate Channels' faders up and down. The volumes of the synth sounds should now change as you move the faders.
- Click "START". All the fader movements have been recorded in the current track and you will be able to watch them move in Playback mode: the current track contains all the Control 7 data.

If you have problems, check the following:

- Have you selected the correct port?
- Did you move the correct faders/MIDI Channels?
- Is the synthesizer able to understand MIDI Volume messages?

Note 1: most drum machines do not support MIDI Control 7.

Note 2: switch on "TRUE Volume" ("MIDI" menu) so that each time you position CREATOR/ NOTATOR, the current MIDI Volume settings are transmitted.

Note 3: the RMG can only be active for one port at a time, so never change ports during recording or the results will be unusable.

6. "COPY TO ALL"

Clicking "COPY TO ALL" copies the value of the current fader (with the flashing box) to all the other faders and transmits the values over MIDI. In Record mode, these values are recorded in the current track.

This function is useful if you want to set all the MIDI devices to full or zero volume.

7. Fader position snapshots

Along the bottom of the RMG screen there are 16 small boxes. These can show a miniaturized snapshot of the fader positions and are used to store and recall the positions of all 16 faders. If the sequencer is in Record mode, the action of recalling the snapshots injects all the fader positions into the current track simultaneously.

Right-click a snapshot box to store the current fader positions. This gives you a mini-representation of the current positions.

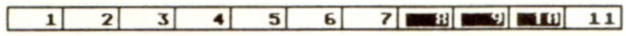
Left-click a snapshot box to immediately recall the stored fader combination and transmit the positions over MIDI.

The snapshot function can be used while the sequencer is running to store and recall positions. It does not store fader movements.

Do not confuse storing and recalling snapshots with recording and playing back MIDI data. Storing and recalling MIDI data is done by recording data in a track, then playing it back. The snapshot function stores fader positions within the RMG only: the events generated by left-clicking a snapshot are not stored in the RMG, but in the current track if in Record mode. Recording events in a track (by moving faders or clicking snapshots) and saving the song to disk is the only way to save your RMG results.

8. Fader grouping

Immediately below the numerical display of the current fader positions there are 16 small boxes showing the fader numbers (1-16).



To group faders, left-click the boxes (black) of the faders you require. Moving one of the faders in this group moves the whole group, keeping the faders' relative positions.

Ideas: by assigning faders to a group, you can fade out all the instruments on one port, or maybe just those "related" to each other, such as drums, percussion and bass.

Faders can be moved separately, whether or not they belong to a group, by using the right mouse button.

Note 1: the relative differences between faders in a fader group will be kept as long as the mimimum and maximum values are not reached. If a group is faded as far down as possible, all the faders will be given value "0" and will then be equal.

Note 2: bear in mind that larger groups can produce enormous quantities of data which very quickly fill up the memory, especially if you have a 1 Megabyte computer. Try to be economical in your use of fade-ins, fade-outs and group movements in Record mode.

9. Fader grouping snapshots

9.1 Storing and recalling fader group snapshots

You can store up to 16 lots of faders groupings in the snapshot boxes as follows:

- Form a group as required
- Store the group by holding down the 'Shift' key while right-clicking one of the snapshot boxes.

To recall a group, hold down the 'Shift' key while left-clicking the snapshot box.

No MIDI data will be transmitted while you are doing this. Thegroup you have selected is now active and can be controlled collectively.

9.2 Storing and recalling some (not all) faders positions

It is not always desirable for every fader's data to be transmitted over MIDI when a snapshot is recalled. The RMG can therefore restrict the storing and recalling of fader positions to selected faders.

Storing:

- Form a group by clicking the group boxes.
- Set the desired fader positions (using the right mouse button).
- Store this setting by holding down the 'Shift' key and right-clicking a snapshot box.

Recalling:

- Left-click the desired snapshot box without holding 'Shift'.

This recalls the fader positions of the group only and transmits them via MIDI. The faders not in this group will not be affected and will not transmit their data via MIDI.

Note: RMG snapshots are stored with a song and can be loaded into other songs separately using "Load System" (see Chapter 28: "DISK OPERATIONS", section 3 "Load System").

10. RMG tips

Snapshots can be used to give each pattern in the arrange list a specific mix volume ratio. To do this, record the snapshot's MIDI data on or before the first beat of the pattern. The easiest way to do this is to select an empty track, select the position you want in the Main Bar Counter with CREATOR/ NOTATOR in Stop mode, click "DROP" to go into Record mode and then left-click the desired snapshot.

If recording a separate mix in a pattern, it is advisable to ensure "TRUE Volume" is on ("MIDI" menu), record the mix a few pulses before the pattern's first beat (eg "_ 4 4 40"), then give the relevant arrange entry its own "UPBEAT" value by the same amount (if they occur before a pattern's first beat, TRUE functions will only be "seen" in the arrange list if there is a corresponding "UPBEAT"). *See also Chapter 20: "ARRANGE MODE".*

It is preferable to do the mixing in a separate "No Limit" pattern in its separate arrange chain (eg "d").

11. User-defined RMG elements (STATUS: P_USER 5-12)

11.1 The basics

Each control element (faders, switches or "digital readouts") is allocated to its own P_USER event: P_USER 5 to 8 have the faders, and P_USER 9 to 12 the switches and digital readouts.

P_USER events 5 to 12 can be used as "stand-ins" for any freely-definable MIDI message *(see also Chapter 8: "TYPES OF EVENT", section 7 "Pseudo events").* **The data chain allocated to a P_USER event can be up to 14 individual data bytes long.**

If such a P_USER event is generated, it carries out the task set by the definition: it issues a MIDI message based on the data chain allocated to it.

P_USER events themselves can be viewed in the event editor after a recording. The "CHANNEL" column in the event list shows the fader number (1-16). The "second data byte" shows the fader value.

The RMG shows a maximum of 32 control elements at a time (16 faders plus 16 switches or digital readouts). Switch between "Sets" by selecting "P_USER 5" to "P_USER 8" in the "STATUS" box. The faders are allocated to P_USER events 5 to 8.

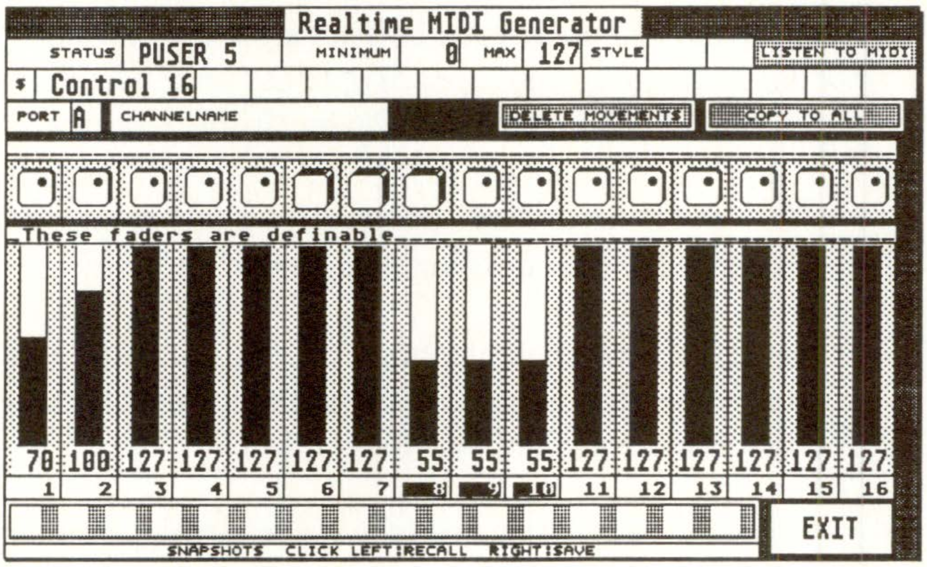
The 16 switches and digital readout settings are allocated to P_USER events 9-12. They do not appear directly in the "STATUS" box, but are shown in the event list after a successful recording and can be edited.

For example, if you select "P_USER 5", P_USER 9 will receive the switches and digital readouts. P_USER 6 is linked to P_USER 10, P_USER 7 to P_USER 11, P_USER 8 to P_USER 12.

There are therefore 128 freely-definable control elements in the form of faders, switches or digital readouts (4 P_USERs times 32 elements).

11.2 Overview

If you select P_USER 5, 6, 7 or 8 in the RMG's "STATUS" box, the following things will happen on the screen:



The "MINIMUM", "MAX" AND "STYLE" parameters and the "LISTEN TO MIDI" icon will appear on the top line.

"MINIMUM" and "MAX" are used to set the maximum and minimum values of a control element, whilst "STYLE" is used to choose between the digital readouts and switch elements.

"LISTEN TO MIDI" automatically defines the message chain by analyzing external incoming MIDI data.

The line underneath the "STATUS" box is divided into 14 little boxes: this is the "definitions line". The first, slightly larger box shows the first value as a MIDI Status for easy legibility. The other boxes receive the additional values of the definable message.

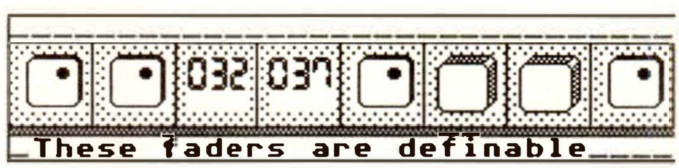
Note: *if you want to enter SysEx messages by hand, leave out F 0 (which can be selected in the first box of the "definitions line") and F 7 (EOX = End Of Exclusive; which is automatically sent by the program).*

To switch between decimal, hexadecimal and ASCII displays, click the little "dollar" box ("$").

In the narrow line below the "COPY TO ALL" icon but above the faders, the switches and digital readouts can be labelled by typing in text.

Directly below this are the 16 control elements: switches or controllers in the form of three-digit digital readouts.

Below this in turn is a narrow line for entering text which labels the faders.



11.3 Defining the digital readouts, switches and faders

Decide what the top 16 control elements are to look like, as follows:

- Click one of the control elements with the mouse. Its border will now blink on and off.
- Click the box next to "STYLE" in the top line to choose between a switch or digital readout.
- Now define its lowest and highest values (or the "off" and "on" values for switches) in the "MINIMUM" and "MAX" boxes. For most controllers, 0 will be "off" and 127 will be "on".
  If you have selected the "switch" as controller, the "switch off" setting will correspond to the "MINIMUM" value and the "switch on" setting to the "MAXIMUM".
- Define any MIDI message in the line below with the 14 boxes. If you leave a box empty, its value will not be sent. "VAL" means "value" and means that the current fader or switch setting will be sent at that position.

If you have chosen a "continuous" controller (fader, digital readout), you can set and send any value between the minimum and maximum. If parameter changes using SysEx data are involved, an upper and lower limit can be especially useful.

The "MINIMUM" and "MAX" parameters can be defined for all controllers, even faders. The range of a fader's movement on screen is correspondingly limited.

11.4 Example: user-defined faders with Control 10

Suppose you want to allocate the message "Send MIDI Control 10 on Channel 1 with adjustable range" to fader 1. On compatible devices, MIDI Control 10 controls the stereo panning of a sound.

- Choose "STATUS" "P_USER 5" and click fader 1.
- Set the value "Control 1" in the first box of the definitions line. This "1" is the MIDI Channel.
- Enter the MIDI Control number "10" in the next box of the definitions line.
- Enter "VAL" in the next box. This means that this value can be controlled with the fader. In this case it is the "second data byte" of the MIDI Control 10 event (the pan position) which is controlled.
- Now control the synthesizer by moving the fader. Set the master keyboard to transmit on Channel 1 if you want to hear the effect live; set the receiving synth to receive on Channel 1, and the sound you have selected should react to the panning events being generated.
- Click an empty track.
- Record a few fader movements. These will move during Playback.
- Look in the event list to see the events: only the P_USER event has been saved, not the actual panning data.

Note: you can even subsequently alter the "second data byte" of an RMG P_USER event in the event list. However, changing the "first data byte" or fader number will make a nonsense of the allocation you have already set, so this is normally not a good idea.

11.5 "LISTEN TO MIDI"

Manually entering large numbers of long message chains can take a great deal of time and effort. In many cases you can save yourself the trouble by using the "LISTEN" function.

If you click the "LISTEN TO MIDI" box, CREATOR/NOTATOR will go into a kind of "Record" mode and compare a series of successive incoming MIDI messages. It analyzes which MIDI bytes show a constant value and which show variable values. This means you can allocate a synthesizer function to a fader, switch etc, without entering numbers manually.

Example: suppose you want to automatically allocate the event "Modulation wheel on Channel 1 with variable amount" to a fader using "LISTEN TO MIDI":

- Click fader 2.
- Click "LISTEN". The "busy bee" means that the program is waiting for a MIDI message.
- Now slowly turn the modulation wheel. The entry should look like this:

STATUS column:	P_USER 5
Box 1:	Control 1 (Status "Control", MIDI-Channel 1)
Box 2	1 (Control number, modulation wheel")
Box 3	VAL (amount depends on fader)

The modulation data was analyzed as follows:

Message	Status	Channel	1st data byte	2nd data byte
1.	Control	1	1	xx (Value 1)
2.	Control	1	1	yy (Value 2)
Result:	Control	1	1	vv (VAL)

This is just an example of the underlying principle: Mod Wheel data is, of course, easier to produce by just moving the wheel.

Try experimenting with System Exclusive data as well. This method allows the control of synthesizer sound parameters in realtime, which opens up a huge range of possibilities.

Check the following if you encounter any problems:

- Ensure nothing is being filtered in the "Input Handling" window ("MIDI" menu) (no grey boxes).
- The synthesizer etc must be able to actively send the type of data you want.
- If you are using SysEx data, the MIDI device must not send any "Checksums".
- No "handshaking" communication must be required.
- The length of a single message must not exceed the total length of the message chain (maximum 14 bytes).

11.5 Example: realtime control over reverb

The following section describes how to control the reverb effect of a Lexicon LXP-1 digital reverb processor in realtime. You can use SysEx data to control various features such as reverb length, pre-delay etc.

Below is a list of SysEx messages, what they mean and a suggested layout for the RMG control elements. This example assumes that the LXP1's receive Channel is set to "16". If you want to use another Channel, alter the third data byte in the definitions line (here: 47 = Channel 16) to a different value (eg 32 = Channel 1).

Use the first "RMG set" with Status P_USER 5 (and P_USER 9).

Switch 1 (P_USER 9 [Channel 1])

Definition line:

SysExcl	6	2	47	65	0	VAL	0	

(Effect Type)

Style: Digital readout, value range: 0-15
This selects the type of effect. Choose "0", a reverb program.

Switch 2 (P-USER 9 [Channel 2])

Definition line:

SysExcl	6	2	47	2	2	0	VAL

(Volume)

Style: Switch, value range: 0-64.
This switch switches the effect on/off.

Fader 1 (P_USER 5 [Channel 1])

Definition line:

SysExcl	6	2	47	2	2	0	VAL

(Volume)

Value range: 0-127
This fader smoothly controls the amount of effect.

Fader 2 (P_USER 5 [Channel 2])

Definition line:

SysExcl	6	2	47	0	2	0	VAL

(Decay)

Value range: 0-64
This fader controls the reverb length.

Fader 3 (P_USER 5 [Channel 3])

Definition line:

SysExcl	6	2	47	1	2	0	VAL

(Delay)

Value range: 0-64
This fader controls the reverb effect's pre-delay and early reflections times.

Fader 4 (P_USER 5 [Channel 4])

Definition line:

SysExcl	6	2	47	5	2	0	VAL

(Size)

Value range: 0-64
This fader determines room-size simulation and correlates to the reverb length (fader 2).

Fader 5 (P_USER 5 [Channel 5])

Definition line: SysExcl | 6 | 2 | 47 | 7 | 2 | 8 VAL

(Diffusion)

Value range: 0-64
This fader softens the attack of percussive sounds.

Fader 6 (P_USER 5 [Channel 6])

Definition line: SysExcl | 6 | 2 | 47 | 6 | 2 | 8 VAL

(Feedback)

Value range: 0-64 This fader determines the reverb feedback level. Caution: self-oscillating feedback is easily created.

Fader 7 (P_USER 5 [Channel 7])

Definition line: SysExcl | 6 | 2 | 47 | 3 | 2 | 8 VAL

(Low Frequency Amount)

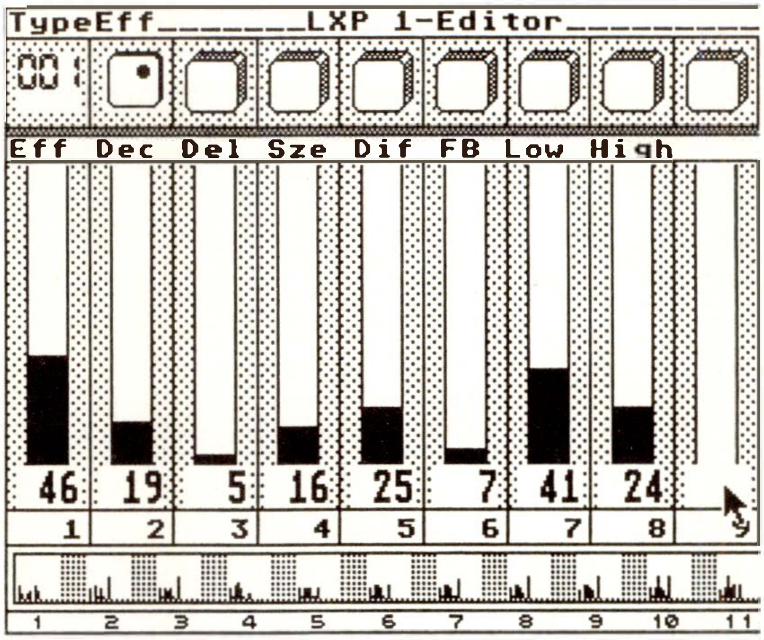
Value range: 0-64
This fader controls the amount of low frequencies in the effect (32 = neutral).

Fader 8 (P_USER 5 [Channel 8])

Definition line: SysExcl | 6 | 2 | 47 | 4 | 2 | 8 VAL

(High Frequency Amount)

Value range: 0-64
This fader controls the amount of high frequencies in the effect (32 = neutral).



These parameters listed above must be entered by hand because the LXP-1 does not send all its data ("Parameter Change") actively.

23. Realtime MIDI Functions

23. Realtime MIDI Functions

CREATOR and NOTATOR can process MIDI data in a multitude of ways as it flows in, "live", as you play. Another word for "live" processing is "realtime": calculations happen so quickly that there is no perceptible delay between the data arriving, being processed, and leaving again.

These realtime functions are comparable to what MIDI processors or MIDI mother keyboards do.

1. Signal flow

When MIDI arrives at one of the MIDI Inputs, it is routed to the following functions in the specified order without perceptible delay:

1. MIDI In
2. Input filter
3. "Realtime Transform" (2 stages)
4. MIDI merge of all 3 Inputs
5. Recording in the current track
6. MIDI Thru function
7. Realtime Ghost output.

2. MIDI Inputs

The Atari's own MIDI In is identified in CREATOR/NOTATOR by a Roman 1: "I".

With UNITOR, you also have additional Inputs "II" and "III".

All three Inputs can be received ("merged") at the same time, even where there is lots of data.

System Exclusive messages (eg sound data) can be received at any of the Inputs. However, because of the non-standard structure of SysEx, merging is not always possible if long SysEx messages are received simultaneously at more than one port. Try to avoid this situation.

If you are not using all three Inputs, use the extremely reliable Inputs II and III in UNITOR, especially in live and in SMPTE synchronization situations.

3. Input handling

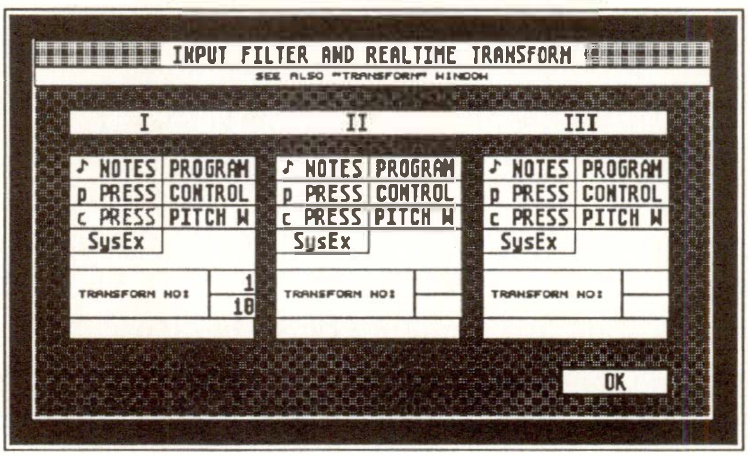
Each Input has its own Input filter and two "REALTIME TRANSFORM" stages. "REALTIME TRANSFORM" is perhaps the most powerful of the realtime functions, allowing live events to be:

- transformed into virtually anything (eg Pitch wheel into tempo, or inverting the keyboard),
- deleted (eg deleting (filtering out) all incoming Channels 10-16 events),
- "transcopied" (eg instantly producing notes an octave above as well).

With REALTIME TRANSFORM, your master keyboard vastly increases its power *(see Chapter 24: "TRANSFORM").*

3.1 Input filter

In the "Input Handling" window ("MIDI" menu), each Input can independently filter out one or more statuses of incoming MIDI event, preventing selected (grey letters-on-white background) events from being recorded.



There is no reason, on grounds of timing or memory conservation, why you should need to filter out Channel or Poly-Pressure ("Aftertouch") events, because CREATOR has special ways of dealing with this sort of data such as "Play Algorithm" and "Data Reduction" *(see Chapter 30: "APPENDIX"),* though if you never make use of Aftertouch data, it would make sense not to record it.

MIDI data can be sent to the "Transform" function in realtime as it arrives at the MIDI Inputs: enter the number of the desired "Transform Sets" (up to two) in each of the Input boxes: *see Chapter 24: "TRANSFORM".*

4. Merging the three Inputs into one track

The MIDI data streams from all three MIDI Inputs are first filtered in the Input filter and sent to the "Transform" function before being mixed together and recorded in one track.

5. MIDI Thru: empty tracks' "track parameters"

If the MIDI Thru function is on *(see Chapter 21: "OVERALL SETTINGS, section 1 "MIDI Thru"),* the mixed data is output via ports A-F. The output can be affected by the parameters of any empty track, including realtime transposing, velocity compressing, zoning etc *(see Chapter 6: "TRACKS").* The Output Filter of an empty track allows events to be filtered out.

6. Realtime MIDI processing

6.1 Realtime ghost tracks

In addition to the MIDI Thru function, you can bring in a further 64 tracks into CREATOR's realtime MIDI processing capability. These further tracks could be described as "realtime ghost tracks" of the original track. It allows a vast number of realtime possibilities: multi-echo effects, multi-splits, multi-layering, sending to several ports simultaneously *(see Chapter 6: "TRACKS", section 3.11)*, etc.

To make a ghost of another track, enter the master track's pattern and track in the ghost track's "GHOST OF" track parameter.

Any tracks in an active pattern which are "ghosting" an empty track (and therefore the MIDI Thru track), will re-transmit incoming MIDI data in realtime, configured by their own track parameters *(see Chapter 6: "TRACKS", section 3.9 "Ghost of").*

Track parameters CHANNEL, TRANSPOSE, VELOCITY, COMPRESSION, DELAY, HIGHEST and LOWEST are possible in a ghost track. By using different HIGHEST/LOWEST parameters in several of the Ghost tracks, different splits can be given different treatments. When trying octave doubling or echo effects on the same MIDI Channel, use each track's output filter to filter out overlayered pitch-bending or modulation.

Echo effects with the DELAY parameter are available only when the sequencer is running. Negative DELAY values, QUANTIZE and GROOVE are, as you might expect, not available in realtime.

CREATOR/NOTATOR can play music and simultaneously process realtime ghost tracks: the tracks are freely divided between normal recorded tracks, ghost tracks of recorded tracks and realtime ghost tracks of an empty track.

With the arrange mode off, the tracks in the current pattern are at your disposal. When on, there are up to four simultaneous patterns available, depending on the arrange list and the Main Bar Counter position. This means that you have some interesting possibilities with pre-programmed pattern changes containing different variations of realtime ghost tracks.

If you find that your played notes are "swallowed" at the point where there is a pattern change, you reduce the "UPBEAT" value for the current entry at that point.

If you like to work with realtime ghost tracks in the Arrange mode, it may make sense to assign a separate pattern to your ghosts, and assign the pattern to its own arrange chain, eg "d" *(see also Chapter 20: "ARRANGE MODE").*

Note: by multiplying the amount of MIDI data being sent from the computer's MIDI Output by using realtime ghost tracks, you may be stretching MIDI's timing capability to its limits, even though the MIDI Input is relatively empty. This might in severe cases lead to delays in the re-transmission of data.

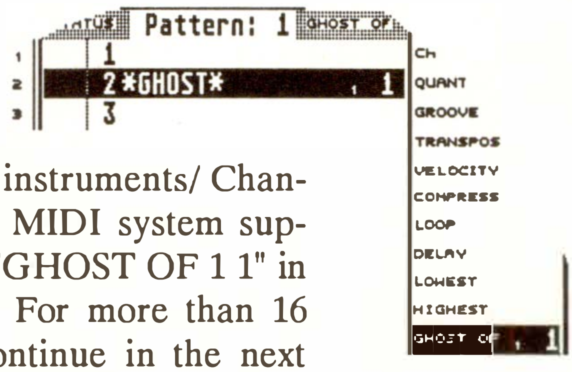
6.2 Examples of realtime ghost tracks

Example 1: sending to 2 MIDI Channels simultaneously

Assign the first Channel in any empty track of the current pattern. This sets the MIDI Thru function's Channel. In a second empty track, enter into its "GHOST OF" track parameter, the pattern and track numbers of the first (empty) track. Give the ghost track a different MIDI Channel.

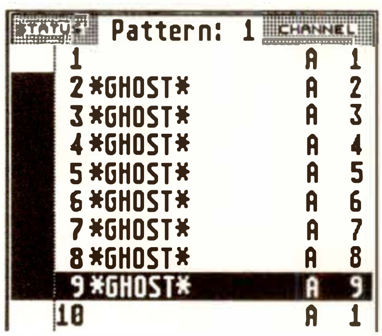
Example 2: sending on up to 96 Channels simultaneously

- Select an empty pattern (pattern 1).
- Leaving track 1 empty, click track 2 and enter "1 1" in its "GHOST OF" parameter.



- For as many instruments/ Channels as your MIDI system supports, enter "GHOST OF 1 1" in more tracks. For more than 16 Channels, continue in the next pattern, not forgetting to enter the patterns in the arrange list in simultaneous chains.

- In each track, select a different MIDI Channel/port.



- Play a note.

Each note you play is re-directed in realtime to all the instruments with the aid of the ghost tracks.

Each track can also receive other parameters as well, such as transposition etc.

24. Transform

24. Transform

24. Transform

1. The basics

The TRANSFORM function allows the transformation of any type of MIDI and P_USER event. Comprehensive "conditions" determine which events should be transformed and how they should be transformed.

"Transformation" in this sense means "changing into something different" or "conversion".

TRANSFORM does not generate events (like, say, the RMG). It can only work with events that already exist.

The TRANSFORM window is also used for deleting events that require more than simple deleting *(see section 2.4.1 "DELETE mode").*

For simple deleting, please see Chapter 18: "COPY, MERGE, ...", section 11.4 "Summary of delete functions", especially the "Fast Delete/Keep" function.

Most of the "event-altering" functions in the program can be done by TRANSFORM as well, eg transposition, velocity changing etc.

Although carrying out these simpler operations is a more complex procedure in TRANSFORM than using the functions designed for them, all sorts of possibilities open up to carry out even very elaborate and unusual calculations on data.

TRANSFORM, in a way, is on a level above all the other functions. Instead of simply altering a value to another value, the user can combine a number of different alterations within one command, determining the ways and means and strategy involved.

The transformation of MIDI data can take place in realtime before any recording allowing you to hear the change as it happens whether the sequencer is stopped or running.

The range of possibilities is almost unlimited: in realtime, your master keyboard can have user-defined velocity curves, control of volume from the modulation wheel, sustain on/off switching from a key etc.

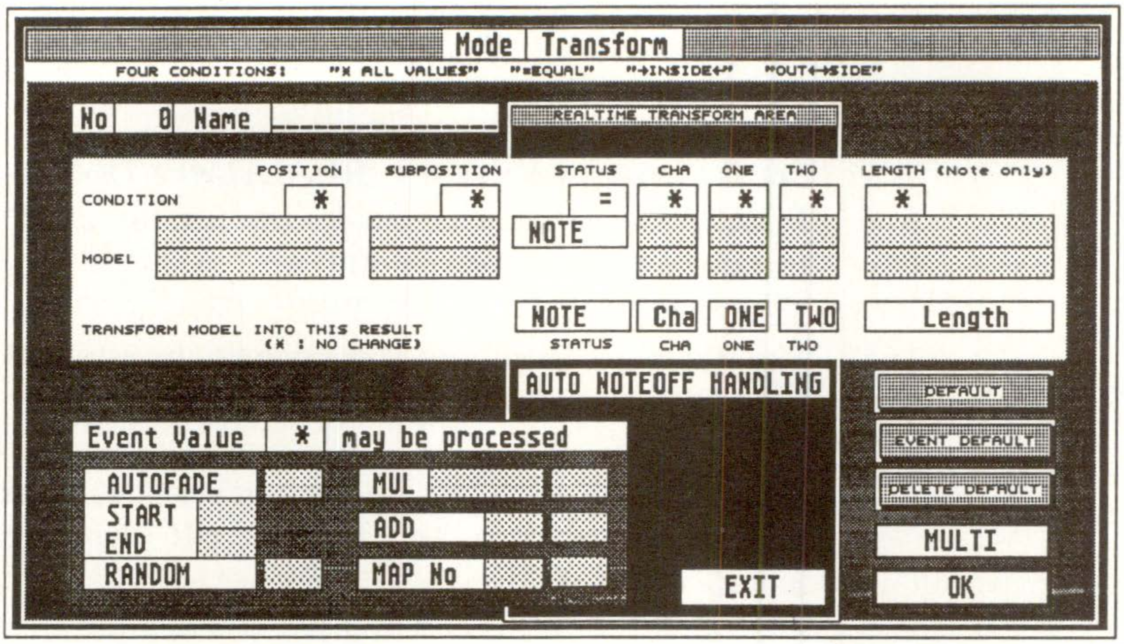
MIDI data can even be transformed into P_USER events *(see Chapter 8: "TYPES OF EVENT")*. This allows commands to be given to the program in realtime from the keyboard, eg controlling track muting, tempo etc from foot pedals, switches, keys, wheels etc.

Transformation can be global ("Multi TRANSFORM": all patterns, all tracks) as well as local (one pattern, track, track segment), or specific to a position (eg every second beat of the bar).

Positions and note lengths are transformable, and periodic and random transformation of values is possible.

To get the most out of TRANSFORM, a basic knowledge of the MIDI data format is assumed. *(Please read Chapters 8: "TYPES OF EVENT" and 9: "EVENT EDITOR".)*

2. Overview: functions and defaults

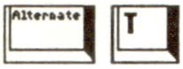


2.1 TRANSFORM and REALTIME TRANSFORM

TRANSFORM allows two different ways of working:

1. Transformation of data already in the computer's memory (RAM): we will call this "TRANSFORM" from now on.
2. Transformation of data in realtime: we will call this "REALTIME TRANSFORM" from now on, because data is transformed just before it is recorded and filed in the RAM. Data is "REALTIME TRANSFORMED" first before passing through the MIDI Thru function to the Outputs and to a track for any recording *(see Chapter 23: "REALTIME MIDI FUNCTIONS").*

2.2 TRANSFORM "Sets"



Click "Transform" ("Functions" menu) or press 'Alternate-T' to open the TRANSFORM window.

There are 11 TRANSFORM "Sets" (complete TRANSFORM windows) in which the desired calculations are determined.

Set 0 is not available for REALTIME TRANSFORM. Use it as your day-to-day Set for casual transformations. Sets 1-10 are available for TRANSFORM and REALTIME TRANSFORM. Use them to store pre-programmed transformations etc.

Top left of the window is the Set number ("No") box and name box. Each Set can have a 16 character name.

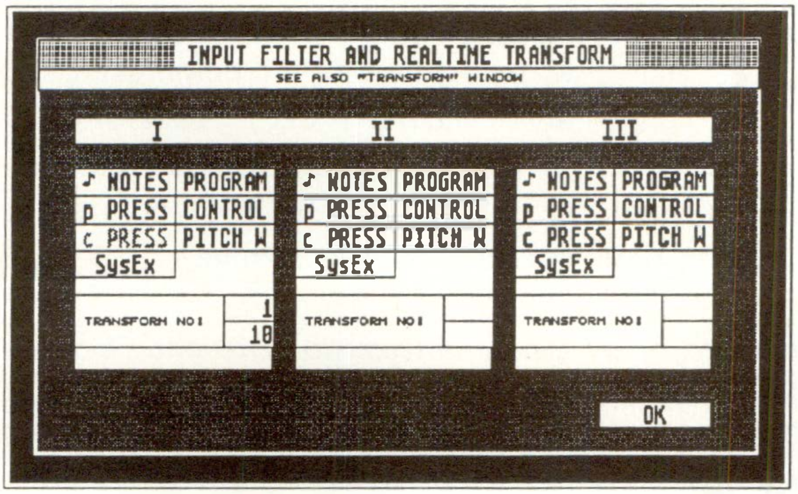
Click the Set number box to select the TRANSFORM Set.

See section 3 for details of the TRANSFORM Set parameters.

2.3 How a Set can be used for REALTIME TRANSFORM

Each MIDI Input (I, II, III) can be subject to two independent TRANSFORM Sets in realtime. The calculations in the Sets have immediate results in realtime.

Insert the REALTIME TRANSFORM Set number(s) in the "TRANSFORM NO." boxes of the "Input Handling" window.



Click "Input Handling" ("MIDI" menu) or right-click the "MIDI THRU" box below the pattern window to enter the Input window from the main page.

To enter the Input window from the TRANSFORM window, click the large black area in the lower half of the window: the "REALTIME TRANSFORM AREA".

See also Chapter 23: "REALTIME MIDI FUNCTIONS".

2.3.1 Overview: data flow

When REALTIME TRANSFORM is active, MIDI flows as follows:

1. Data arrives at one of the Inputs.
2. The "Input Handling" window can filter events by status, stopping the "REALTIME TRANSFORM Sets from receiving them.
3. The TRANSFORM Sets installed in the Input window are flowed through in turn, ie the results of the top one are sent to the bottom one.
4. After transformation, data flows through the MIDI Thru function and, if necessary, is recorded at the same time.

5. The MIDI Thru function, if switched on, applies the "playback" parameters of the empty tracks to the data flow (CHANNEL, TRANSPOSE, VELOCITY, COMPRESS, LOWEST/HIGHEST and the OUTPUT FILTER) before the data leaves by one of the six Outputs.

Note to 5: set the parameters to zero, and "CHANNEL" to "original" to have the original REALTIME TRANSFORM effect without any MIDI Thru function alteration.

2.4 TRANSFORM modes

There are basically three different TRANSFORM modes: select these in the "Mode" box at the top of the window.

2.4.1 "DELETE" mode

Much deleting can be done more simply using other functions *(see Chapter 18: "COPY, MERGE, ...", section 11.4 for a delete summary).* However, it is sometimes necessary to set conditions (eg "delete all Channel 3 notes in the first 20 bars" etc): here, the TRANSFORM function is used in its "DELETE" mode.

Clicking "Delete/Keep Events" ("Functions" menu) enters you directly into the TRANSFORM window's "DELETE" mode.

The action of "keeping" is just another way of saying "delete all other events"; therefore "keeping" events is also done in the "DELETE" mode (eg "delete all notes whose pitches are not C3").

See the examples at the end of this Chapter.

Events that match the "model" and its "conditions" are deleted. This is also possible with REALTIME TRANSFORM.

Events which do not match the "Model" or its "Conditions" are untouched.

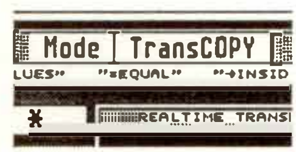
Note: the "RESULT" line *(see section 4.4)* and "VALUE PROCESS" box *(see section 5)* are disabled when the mode is "DELETE", as you cannot delete events "into" a result.

2.4.2 "Transform" mode

Events that match the "Model" and its "Conditions" are transformed into the "Result", with possible further transformation by variables.

Events which do not match the "Model" or its "Conditions" are untouched.

2.4.3 "TransCOPY" mode



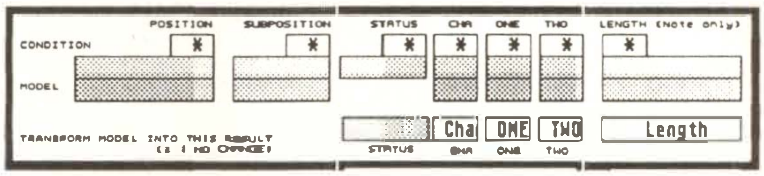
Events that match the "Model" and its "Conditions" are first duplicated. The duplicate is then transformed into the "Result", with possible further transformation by variables, and inserted back among the original untransformed data.

Events which do not match the "Model" or its "Conditions" are not copied nor transformed.

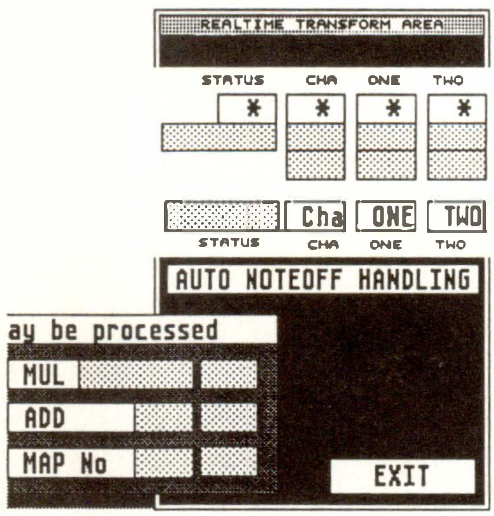
3. Structure of the TRANSFORM window

The TRANSFORM window is divided up into several parts:

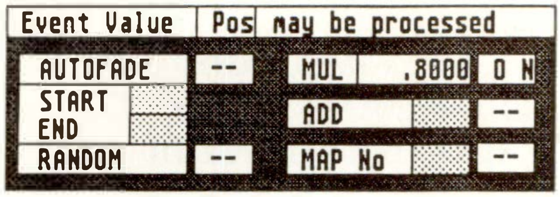
- The large white "TRANSFORM AREA" in the upper half of the window, where you decide how and how much of the data should be transformed ("MODEL" and "CONDITIONS") and what the "RESULT" should be.



- The large black "REALTIME TRANSFORM AREA" partly obscured by the TRANSFORM area *(see section 2.3 above)*.



- The large "PROCESS VALUE AREA" below left in the window. If the "RESULT" line allows, individual event values can be further modified here by various calculations.



4. "TRANSFORM AREA"

4.1 "CONDITIONS"

The various boxes in the top line called "CONDITION" contain "Conditions". The values in each column of the "MODEL" line must match these conditions if they are to be transformed.

There are four conditions:

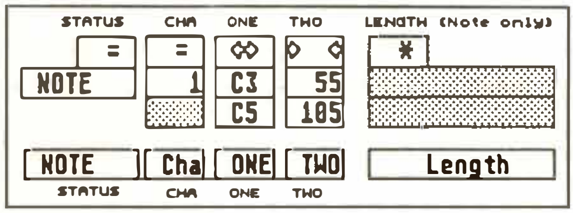
*: means "all values are accepted for transformation, there are no conditions attached to this column".

=: means "only values that match the specific "MODEL" value in this column will be accepted for transformation".

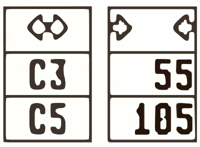
> <: means "only values that are within the two "MODEL" values in this column will be accepted for transformation".

< >: means "only values that are outside the two "MODEL" values in this column will be accepted for transformation".

4.2 "MODEL"



The second line in the TRANSFORM AREA is the first of the two "MODEL" lines. This contains the value(s) which incoming MIDI events have to match if they are to be transformed.

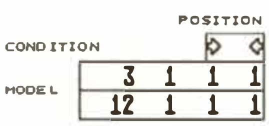


The third line only becomes active when the condition is > < "inside" or < > "outside", and shows the upper or "right" limit of the condition zone.

In other words: line 2 defines the beginning ("from") of the zone, line 3 the end ("to") of the zone.

The "from" and "to" values are always "inclusive/ exclusive", including the "POSITION" columns. See Chapter 30: "APPENDIX", section 1.9 "Values: "inclusive/exclusive"".

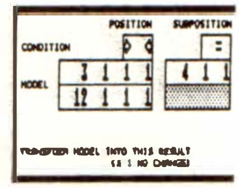
The "MODEL" columns have the following meanings:



<u>POSITION:</u> "events in the track that are on this position or are in the segment defined between the two "locators" are accepted for transformation". Not available in realtime.

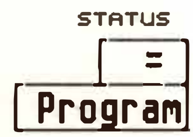
Example: transform all notes in bars 3 to 11 inclusive.

SUBPOSITION: "within each bar which is within the above segment, events that are on this bar position or between these two bar locators are accepted for transformation". Not in realtime.



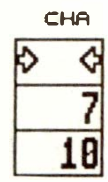
Example: transform all notes in bars 3 to 11 inclusive, but only if they are on the fourth beat of the bar ("4 1 1").

STATUS: "events whose statuses match this status are accepted for transformation". No "inside/outside" conditions are possible because numerical values are not involved.



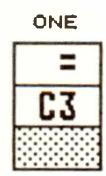
Example: only transform events if they are "PROGRAM" events.

CHANNEL: "events whose Channels match this or these Channels are accepted for transformation".



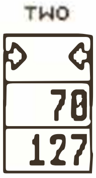
Example: only transform those events whose Channels are 7, 8 or 9.

ONE: "events whose "first data bytes" match this or these values are accepted for transformation".



Example: only transform those events whose pitch is C3.

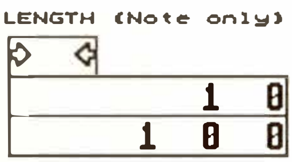
See Chapters 8: "TYPES OF EVENT" and 9: "EVENT EDITOR" for details of the meaning of "first data byte".



TWO: "events whose "second data bytes" match this or these values are accepted for transformation".

See Chapters 8: "TYPES OF EVENT" and 9: "EVENT EDITOR" for details of the meaning of "second data byte".

Example: only transform those events whose velocities are from 70 to 126 inclusive.



LENGTH: "notes whose lengths match this or these values are accepted for transformation".

Example: only transform notes that are 1/16th or longer, but shorter than 1/4.

4.3 "DEFAULT"

The entering of the desired values can also be done from the event editor using the three icons to the right of the window.

DEFAULT: in the event list, click an event line and leave the cursor on one of the event lines. Open "Transform" (eg with 'Alternate-T'). If you click the "DEFAULT" icon:

- the window as a whole will be restored to its default (zero) setting
- the values of that cursored event will be inserted in the "MODEL" line. These values will become visible when the Conditions are set in the "CONDITIONS" line.

EVENT DEFAULT: has the same action as "DEFAULT" with the addition: if you leave the event list cursor in one of the "CHANNEL", "-1-", "-2-" or "LENGTH" columns, open the TRANSFORM window and click "EVENT DEFAULT":

- the value you cursored in the event list is installed (visibly) in the corresponding column of the "RESULT" line.
  This is the same as using the "Fast Transform" function, but using the "Transform" window, therefore allowing other conditions to be added such as limiting the number of bars etc *(see Chapter 9: "EVENT EDITOR", section 18 "Fast Transform").*

DELETE DEFAULT: the "DELETE DEFAULT" icon imports the cursored event's values into the "MODEL" line from the event list and switches the window's mode to "DELETE". Setting the Conditions uncovers the desired values prior to deleting.

4.4 "RESULT"

The fourth line down in the TRANSFORM area is the "RESULT" line. This contains the value(s) into which the events' corresponding values are to be transformed if accepted by the "MODEL" and "CONDITION" lines above.

It also determines which values should be further processed by the "VALUE PROCESS" box below.

The result columns have the following meanings:

STATUS: if this status is different from the model's, the event's status is transformed. Otherwise, it remains as it was.

Example: transforming Control Change 7 Volume events into P_USER 1 tempo events.

CHA, ONE, TWO: if specific values are inserted into any of these three columns, the corresponding values of the accepted events will be transformed into those values.

If the values "Cha", "ONE" and "TWO" (which are inserted in the columns by default), are left in the corresponding columns, the event's corresponding values will remain untransformed. The same applies if the "*" symbol is inserted in these columns instead.

The advantage of using the "Cha", "ONE" and "TWO" values is that they can be used to either move one value into the column of a different value, or to send a value into the "VALUE PROCESS" box for further transformation, in which case, the result varies with the original value.

Example: insert "TWO" in the "ONE" column, and insert "ONE" in the "TWO" column. If the status of the accepted event is a Note, then the velocity determines the pitch, and the pitch determines the velocity.

LENGTH: for accepted notes, a specific length can be inserted here into which the lengths will be transformed.

If the value "Length" (which is inserted in the column by default), is left in the column, the notes' lengths will remain untransformed. The same applies if the "*" symbol is inserted here instead.

The advantage of using the "Length" value is that it can be used to send a length into the "VALUE PROCESS" box for further transformation, in which case, the result varies with the original length.

TRANSFORM example:

Position	Subpos.	Status	Cha	One	Two	Length
> <	*	=	=	=	*	*
1111		Control	3	1		
9111						
		Control	3	7	TWO	LENGTH

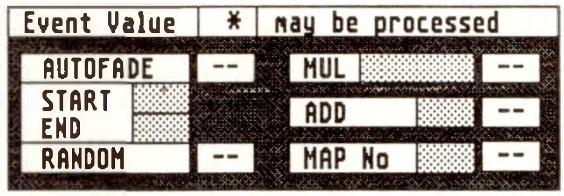
This means: "only accept Control 1 events for transformation if they are on Channel 3 and are situated in the first eight bars of the track, no matter what the amount (column TWO)."

If accepted, the Control 1 Modulation wheel events of this track are transformed into Control 7 Volume events, with the original amount of Mod wheel defining the amount of Volume.

(The "LENGTH" parameter has no meaning when the status is not "NOTE").

5. VALUE PROCESS AREA

The result of the transformation can be influenced by the VALUE PROCESS AREA.



The name of the value to be given this variable processing is inserted in the "Event value ??? may be processed" line. The following values are possible:

- CHA, MIDI Channel
- ONE, "first data byte"
- TWO, "second data byte"
- LEN, note length
- POS, event position
- *, the VALUE PROCESS box is switched off.

Important: these settings relate to the "RESULT" line. The meanings of ONE and TWO depend on the result event's status. *(Please read Chapters 8 and 9 for details of the meaning of "first/second data bytes".)*

The VALUE PROCESS parameters can be freely combined. They are inactive when the box by each name says "--": click this to switch them on. They have the following meanings:

MUL, multiplication/division: data can be multiplied by 999.0000 to -99.0000, with up to four decimal places. Division is the result of multiplying by a value smaller than 1 (eg multiplying by 0.5 divides by two).

Example: multiply all pitch (ONE) values by 2. If the result status is a note, a chromatic scale becomes a whole tone scale.

ADD, addition/subtraction: any value can be added or subtracted.

Example: add -12 to all pitch (ONE) values. If the result status is a note, the notes are transposed down an octave.

MAP, the "Universal Maps": click the word "MAP" to enter the "Universal Maps" window, of which there are 5 user-definable ones. Each of the 128 source values can be allocated to any destination value simultaneously *(see section 6)*.

Example: all C1 notes should become F#3, all B6 notes should become D4 etc, and all at the same time.

AUTOFADE: allows linear value changes to be made between the START and END values. The segment length of this transformation should be set by the two "POSITION" locators. If there is no defined segment, the value increments or decrements by 1 from event to event.

Note: AUTOFADE does not necessarily refer to volume or velocity fades. It can fade, up or down, any desired values between the START and END values.

Example: fading the velocity (TWO) of notes down to value 1 over four bars (this could be done more quickly with the "Process Data" function *(see Chapter 6: "TRACKS", section 4.2))*.

RANDOM: random values can be introduced between the START and END values.

Example: randomizing the pitch (ONE) of a pitched drum during a segment of the song.

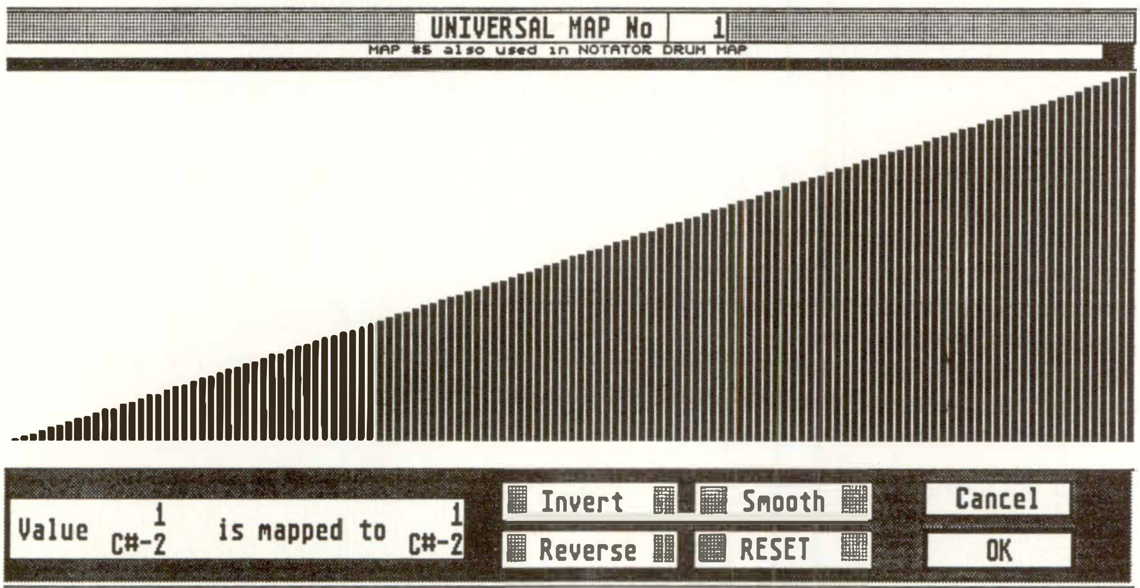
Note: the AUTOFADE and RANDOM parameters are relative to the incoming value - their values are added to the incoming value. To have an absolute result, where the AUTOFADE and RANDOM values replace those of the incoming value, insert a "MUL" value of " .OOOO" (zero).

6. Universal Maps

6.1 The basics

A "Universal Map" is a table of 128 values (0-127). Each source value is given a destination value ("mapping"), and all 128 mappings can take place simultaneously.

The maps default to a balanced configuration: each source value is mapped to an identical destination value so that there is no change. This is seen by the smooth display of beams going up from left to right.



A total of 5 maps can be programmed, though TRANSFORM can use only one map at a time. NOTATOR users should be aware that Map 5 is used by the "Drum Map" function in the mapping of note displays on the stave, so keep clear of Map 5 if you are using that particular parameter of "Drum Map".

6.2 Activating a Universal Map

To activate one of the maps:

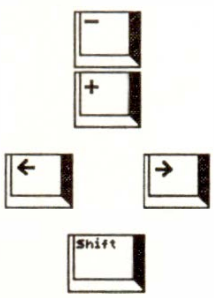
In the TRANSFORM window's "VALUE PROCESS AREA", click the "MAP" parameter to "ON", select the map number and click the word "MAP". The Map number is at the top of the map window that appears.

Alternatively, click "Set Universal Maps" ("Options" menu) to gain access from the main page.

The VALUE PROCESS AREA determines which MIDI or P_USER event value is to be mapped *(see previous sections for details).*

See Chapters 8: "TYPES OF EVENT" and 9: "EVENT EDITOR" for details of the meaning of "first/second data byte" in relation to values ONE and TWO in the TRANSFORM window.

6.3 Entering values



There are many ways to enter values:

- Drag a beam up or down.
- When you first enter a map, click once anywhere in the empty white horizontal bar between the beams and the grey command area. Now you can use the '+' and '-' keys in the calculator keypad to alter the destination value, and the left/right cursor keys to select the source value (adding 'Shift' speeds up the movement).
  Alternatively, you can scroll the destination value by keeping either mouse button pressed just below a beam.
- Alternatively, destination values can be typed in using the calculator keypad's numbers once the beam is selected by direct beam clicking or use of the cursor arrow keys.

6.4 Display of source and destination values

Value 1 C#-2 is mapped to 1 C#-2

The "Value (source) is mapped to (destination)" box shows the map's source and destination values. Values are given in MIDI value number terms, and pitch terms in case the value being mapped is a note's "ONE" value.

6.5 Universal Maps: extra functions

6.5.1 RESET

Resets the map to its default configuration of "same source-same destination", ie neutral.

6.5.2 Smooth

"Smooth" smooths out a curve and evens out jumps and large value differences.

With each left-click, the destination values are quite severely smoothed or ironed out: "hard smoothing".

With each right-click, the smoothing effect is less, but max/min differences within a region are kept: "soft smoothing".

"Smooth" is helpful with Velocity mapping where abrupt changes are not wanted (when value TWO is in the "VALUE PROCESS" box if the "RESULT" status is a note).

6.5.3 Invert

"Invert" inverts the curve: 127 becomes 0, 126 becomes 1, 125 becomes 2... and so on until 0 becomes 127.

Uses: inverting a keyboard for party tricks (when value ONE is in the "VALUE PROCESS" box if the "RESULT" status is a note). Or having a high velocity when playing softly and vice versa (when value ONE is in the "VALUE PROCESS" box if the "RESULT" status is a note).

6.5.4 Reverse

"Reverse" exchanges source and destination values.

Note: clicking "Reverse" once, then once again does not always re-reverse as you might have thought. If more than one source value was being mapped to just one destination value, the function is unable to know which were the original source functions.

6.6 Saving/loading the Universal Maps

Maps are saved along with song data in a *.SON file. They can be independently imported from any *.SON file using "Load System" *(see Chapter 28: "DISK OPERATIONS, section 3).*

7. AUTO NOTEOFF HANDLING

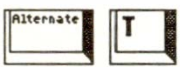
TRANSFORM automatically handles Note Off events when you manipulate Note On events *(see Chapter 30: "APPENDIX", section 1.7 "One note: two events").*

The "AUTO NOTEOFF HANDLING" icon switches this Note Off handling off and on. Basically, you should always leave it on.

8. Operating TRANSFORM

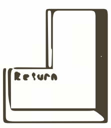
8.1 Transforming a track's data

Click the track before opening the TRANSFORM window, then click "Transform" ("Functions") menu or press 'Alternate-T'.



TRANSFORM is also accessible from the event editor.

To carry out the transformation, click "OK". The window remains on the screen, ready for more commands. If none are required, click "EXIT".



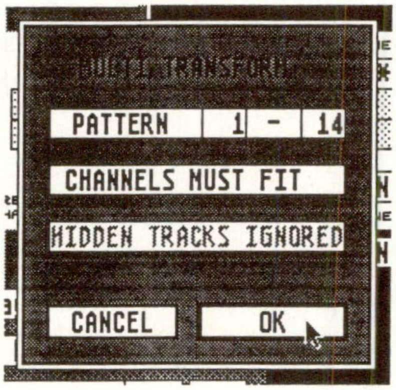
Alternatively, instead of clicking "OK", press 'Return': this carries out the transformation and quits the window.

"EXIT" allows the window to be quitted without any transformation.

8.2 Multi-TRANSFORM (-DELETE, -TransCOPY)

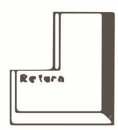
"Multi-TRANSFORM" allows TRANSFORM to be used on more than one track at once. Once a TRANSFORM Set has been prepared, click "MULTI".

In the Multi-TRANSFORM window, set the following parameters:



- first ("from") and last ("to") pattern numbers whose tracks are to be transformed (both numbers are inclusive!).
- if "CHANNELS MUST FIT" is enabled, only those tracks whose "CHANNEL" track parameters match those of the current track will be transformed.
- if "HIDDEN TRACKS IGNORED" is enabled, tracks which are hidden with the "HIDE" function will not be transformed *(see Chapter 6: "TRACKS", section 1.5).*

Click "OK" or press 'Return' to carry out the multi-transformation.



This function is able to alter large parts of the song in one go. It makes sense to save the song to disk before using it, in case the result is not what you intended.

8.3 Operating REALTIME TRANSFORM

The large black "REALTIME TRANSFORM" area gives an optical clue that the POSITION, LENGTH, AUTOFADE and RANDOM parameters are not, logically, available in realtime.

Click the "REALTIME TRANSFORM AREA" to enter directly into the "Input Handling" window. Enter the TRANSFORM Set numbers (not Set 0) in each Input box: 2 sets per Input. If UNITOR is connected, up to six Sets could be in simultaneous use.

The action of entering the Set numbers in the "Input Handling" window activates those Sets for realtime use.

Note: it is sometimes important in which order the two Sets are entered in each Input.

8.4 REALTIME TRANSFORM examples

The following examples serve to illustrate the realtime applications of TRANSFORM. You will find it useful to work through them to gain more of an insight into their workings.

Example 1

This example shows how to slightly expand the dynamics of the velocity in realtime, so that weakly-struck notes become quieter and forcefully-struck notes louder (assuming the keyboard is velocity-sensitive).

- The MIDI Thru function must be on, and "Auto-Off Channel" must be off/blank (both in "MIDI Thru" in the "MIDI" menu). The keyboard must be switched to "MIDI Local Off" if it is a synthesizer being used for its own sounds.

- Press 'Alternate-T' to enter the TRANSFORM window. Click the black "REALTIME TRANSFORM AREA" to enter "Input Handling". Assuming the keyboard is connected to Input I, place a "1" in the upper "Transform No" box. Click "OK".
- Back in the TRANSFORM window, select Set 1 and click "DEFAULT" to zero it. Check that the status of both "MODEL" and "RESULT" lines says "NOTE".
- Install TWO in the "Event value ??? may be processed" line (TWO defines the note's "second data byte": velocity).
- Switch "MUL" to "ON", install value "1.3000". Play the keyboard: its velocities have all been slightly increased (once the "Input Handling" window is looking at a Set number, whatever values you install in that Set can be heard live).
- Switch "ADD" to "ON", install value "-13". This takes 13 velocity points away from every note to allow the velocity range to fit within the MIDI 0-127 range.

This example helps expand the velocity of, for instance, a DX7 synthesizer's keyboard.

Example 2

You would like to be able to switch between two pre-programmed levels of volume (Control 7) with the sustain footswitch (Control 64).

For REALTIME TRANSFORM you require two Sets installed in the correct MIDI Input box in the "Input Handling" window.

Set 1:

STATUS	CHANNEL	ONE	TWO
=	*	=	=
Control		64	0
Control	Cha	7	96

Set 2:

STATUS	CHANNEL	ONE	TWO
=	*	=	=
Control		64	127
Control	Cha	7	127

Without the footswitch (its TWO value is 0), the volume is 96. When you press the footswitch (TWO value "127" means "on"), the volume is 127.

Example 3

For REALTIME TRANSFORM, install the required Set number (not 0) in the correct MIDI Input box in the "Input Handling" window.

First set the synthesizer's "pitch bend range" to 12 semitones (one octave).

For a "guitar-like" solo, you would like the upwards movement of the pitch wheel to be limited to one tone's bend, but the downwards movement to go down a full octave.

There are two ways of achieving this:

Version 1:

STATUS	CHANNEL	ONE	TWO
=	*	*	> <
PitchWh			74
Control			74

Here, the upper end value (two semitones higher) has already been reached 1/6th of the way up.

Version 2:

STATUS	CHANNEL	ONE	TWO
=	*	*	> <
PitchWh			65
			128
PitchWh	Cha	ONE	TWO

Value TWO may be processed
MUL: "0.08" and "ON"
ADD: "64"

Here, the upper end value is reached by full movement of the wheel upwards. This is done by compressing the upwards values; all the in-between values are kept.

9. TRANSFORM examples

The following examples are equally suitable both for REALTIME TRANSFORM and normal transformation of existing data in a track. You will find it useful to work through them to gain more of an insight into the workings of TRANSFORM.

Example 1

The Modulation wheel (vibrato) effect is too much for the sound being used in a solo:

STATUS	CHANNEL	ONE	TWO
=	*	=	*
Control	Cha	ONE	TWO

Value TWO may be processed:
MUL: "0.7" and "ON"

The "second data byte" "amount" values are represented by the "TWO". By dividing by "0.7" values are reduced, eg 50 becomes 35.

Example 2

An existing string of Modulation wheel events need to be transformed into a smooth Volume fade-in during the first four bars.

Remember that events have to exist before they can be transformed: TRANSFORM does not produce events "out of thin air", unlike the Realtime MIDI Generator or Hyper Edit.

POSITION	SUBPOS.	STATUS	CHA.	ONE	TWO
> <	*	=	*	=	*
1 1 1 1		Control		1	
5 1 1 1		Control	Cha	7	TWO

Value TWO may be processed:
AUTOFADE: "ON" MUL: 0.0000 ON
START: 0
END: 128

By multipling by "0", you ensure that, whatever the original values of the Mod wheel events, their "second data bytes" are replaced by a linear change between 0 and 127.

The smoothness of the fade depends on how many events there are between the two POSITION locators. The more events there are, the smoother the effect.

Example 3

Changing a Mod wheel movement into Tempo (P_USER 1 events).

STATUS	CHANNEL	ONE	TWO
=	*	=	*
Control		1	
P_USER		1	TWO

Value TWO may be processed:
MUL: "2.0" und "ON"

Control 1 events are transformed into P_USER 1 ("absolute tempo") events. Their "second data bytes" (TWO) are doubled to take advantage of the full range of tempo, which can go up to 250 bpm, whereas normal "second data bytes" only go up to 127.

Example 4

Changing all MIDI Channel 3 notes to Channel 5.

STATUS	CHANNEL	ONE	TWO
=	=	*	*
NOTE	3		
NOTE	5	ONE	TWO

Example 5: "DELETE"

Deleting all notes whose Channels are 10 to 14 inclusive. This can also be done in realtime.

You can either enter the TRANSFORM window and click the "DELETE DEFAULT" icon to put the window in "DELETE" mode, or enter the window via "Delete/Keep Events" ("Functions" menu), in which case the window will already be in "DELETE" mode:

STATUS	CHANNEL	ONE	TWO
=	> <	*	*
NOTE	10		
	15		

(there is no "RESULT" line in "DELETE" mode)

Example 6: "keeping"

Keeping all C3 notes on Channel 1 if they are above velocity 90 (in other words, delete all other notes). "DELETE" mode:

STATUS	CHANNEL	ONE	TWO
=	< >	< >	< >
NOTE	1	C3	90
	2	C#3	127

(there is no "RESULT" line in "DELETE" mode)

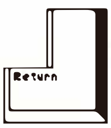
Here, you are deleting all events whose Channels are "outside" 1, whose pitches are "outside" C3 and whose velocities are "outside" the 90-127 zone.

Example 7: mapping a drum track

You have a drum track containing a number of drum notes that relate to your own drum machine. A friend brings in a drum machine set to a different note/drum configuration which you want to use for this song. Neither of you wants to change the internal parameters of either machine. Use TRANSFORM with a Universal Map:

STATUS	CHANNEL	ONE	TWO
=	*	*	*
NOTE			
NOTE	Cha	ONE	TWO

Value ONE may be processed:
MAP 1: "ON"



Your drum machine's notes are the source. Your friend's machine's notes are the destination. Map each drum to the same drum destination in your friend's machine. When all the drums are mapped, click "OK" in the Map, then press 'Return' in the TRANSFORM window.

Example:

Snare: map C1 to C3
Kick: map D1 to G3
Tom1: map B1 to D4 etc

10. Saving/ loading the TRANSFORM Sets

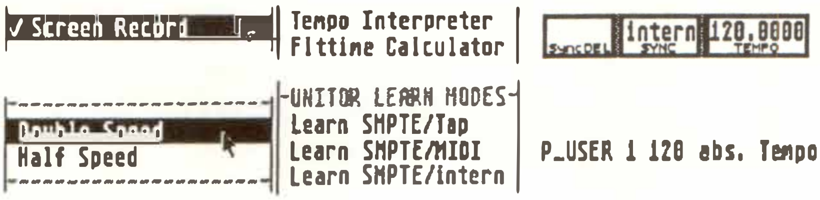
The 11 Sets including all their parameters form part of a song's data and are saved in a *.SON file. "Load System" *(see Chapter 28: "DISK OPERATIONS", section 3)* allows them to be imported separately into an exisiting song from any *.SON file.

11. Transformations overview

Desired transformation		Use this parameter
1. Reduction	a) by division	"MUL" (less than 1)
	b) by a set amount	"ADD" (minus)
2. Increase	a) by multiplication	"MUL" (great. than 1)
	b) by a set amount	"ADD" (positive)
3. Compression/Expansion		
	a) to a set amount	"RESULT" line
	b) linear	"MUL"
	c) optional	"MAP" (curve)
4. Change over time		
	a) swell up/down	"AUTOFADE"
	b) random	"RANDOM"
5. Conversion	c) user-defined	"MAP"
6. Inversion		"MAP" ("Invert")
7. Allocation	a) optional	"MAP"
	b) direct	"RESULT" line
	c) random	"RANDOM"
	d) swap columns	eg "TWO" to "ONE"

25. Tempo

25. Tempo



1. The basics

To ensure that recorded notes and other events are arranged in precisely the right order, any sequencer must have a form of internal metronome or "time keeper": this is the sequencer's "clock", which, like all clocks, gives out ticks or "pulses", though these pulses are internal and not heard by the user.

The closer its pulses are to each other (called the "resolution"), ie the more pulses there are in a given unit of time, the more accurately the sequencer can time the position of an incoming event. An incoming event is assigned to the nearest clock pulse.

Normal analogue tape recording represents the highest resolution you can ever get, because an analogue tape recorder does not have to use a clock to time notes.

To use the built-in advantages of the sequencer, such as "quantization" (time correction), the pulses relate to whole fractions of musical units. As a consequence, the user must play in time with the metronome.

Only then can the sequencer recognize the user's intended timing, and only then can the positioning or altering of events' time positions be expressed in terms of bars, beats etc.

The speed of the clock is governed by CREATOR/ NOTATOR's "tempo".

See also Chapter 30: "APPENDIX", section 1.8 "Resolution: display in notes or pulses per quarter note?", and Chapter 5: "POSITIONING", section 2 "Internal clock resolution...".

2. Tempo without changes

The tempo display is in the "TEMPO" box in the "information bar" over the top of both the main page and event editor. In "Internal Sync" mode, it can be set from 25 to 250 beats-per-minute (bpm).

It can be clicked with either mouse button, or altered using "mouse as slider" or "'Control'+mouse" *(see Chapter 3: "GENERAL HANDLING", section 1).*

The tempo is valid for the entire piece of music in the sequencer if there are no "tempo changes" made by "P_USER 1" events (see below).

The tempo display can be set with the precision of up to four decimal places, for example 120.0001 bpm. From a musical point of view this precision is quite unnecessary, since the difference between, say, 120.0001 and 120.0002 is not perceptible.

Note: in "Internal Sync" mode, the tempo resolution goes as far as two decimal places, eg 120.01.

The point in having such a high tempo resolution is to allow synchronization of the music to external synchronization sources to take place to the nearest millisecond (or better), which is possible with the C-LAB UNITOR. Examples: video post-production, or the simulation of other synchronizers' timing characteristics *(see also Chapter 27: "UNITOR ...", section 9 "Editing a "Sync Reference").*

Internal tempo changes cannot take place in "MIDI Sync" mode: these are governed by the external synchronizer, though external tempo changes will be displayed in the "TEMPO" box *(see Chapter 26: "SYNCHRONIZATION", section 4 "MIDI Sync" mode")*.

In "MIDI Sync" mode, it does not matter if CREATOR/NOTATOR's tempo display shows a slightly different tempo to that of the external synchronizer, or even moves about *(see Chapter 30: "APPENDIX", section 1.6 "Clock "Interpolation"...".*

3. Tempo changes via "screen recording"

When "Screen Recording" ("Flags" menu) is ticked, tempo changes are possible by altering the tempo display during Record mode.

Click an empty track, click "RECORD" and alter the tempo display using the mouse. You can also use the "mouse as slider" function, or the 'Control'+mouse feature *(see Chapter 3: "GENERAL HANDLING", section 1 "Mouse").*

'Control' + mouse has an additional feature for use with screen recording: if the 'Shift' key is held at the same time as 'Control', changes to the tempo are not recorded until 'Shift' is released, allowing real-time jumps in tempo to be made.

Tempo changes are recorded as "P_USER 1" (absolute tempo) events in the current track *(see also next Chapter).*

P_USER 1 (absolute tempo) events are "TRUE" events *(see Chapter 5: "POSITIONING", section 3.2 "TRUE Tempo").*

4. Tempo changes via event editor

P_USER 1 events allow you to pre-program a completely new tempo at any time position by scrolling their "second data bytes".

To do this, drag a P_USER event from the "PSEUDO" icon into the event list *(see Chapter 9: "EVENT EDITOR").* Ensure the P_USER event says "1" in the "-1-" column. The "-2-" column contains the tempo value, in whole bpms.

Tip: tempo changes with decimal places must be created using the "Fittime Calculator" (see section 5 below).

Example:

1 1 1 1 P-USER 1 120 abs. Tempo
4 1 1 1 P-USER 1 130 abs. Tempo

Here, the tempo is 120bpm at the beginning of the pattern, changing to 130 bpm at the beginning of the fourth bar.

P_USER 2 events are "relative tempo" commands that add to or subtract from the main tempo.

P_USER 2 events will only work in "Internal Sync" mode.

They can only be entered manually into the event list (no screen recording), and their use is limited to "Internal Sync" mode. The "second data byte" in column "-2-" of the event list gives the number of bpms added to or subtracted from the main tempo.

P_USER 2 events are useful in situations where the ratio of tempo changes is to remain constant, even if the main tempo is altered. P_USER 2 events are not "TRUE" events.

Tip: keep tempo changes in their own track. This makes it easier to see what your tempo programming is, and helps when using the "Create Using Tempo Of..." function in the "Sync Reference" window (see Chapter 27.: "UNITOR ...", section 8.2).

5. "Fittime Calculator"

Tempo changes using up to four decimal places can be inserted with the "Fittime Calculator". This is of special use during "SMPTE Sync" mode synchronization in video etc post-production *(see Chapter 27: "UNITOR ...", section 13 "Fittime Calculator").*

You may use the Fittime Calculator to insert P_USER 1 events which have decimal places. This is not possible by the normal process of dragging P_USER 1 events into the event list *(see section 4 above).* To do this, ensure the upper segment display is set to the desired time position, select the tempo and click "INSERT TEMPO CHANGE". In "Internal Sync" mode, up to 2 decimal places are recognized by the program.

6. Tempo changes via the "Tempo Interpreter"

Tempo changes can be created and recorded by the analysis of external timing from:

- incoming MIDI notes *(see Chapter 26: "SYNCHRONIZATION", section 6)*, and
- incoming acoustic sounds with HUMAN TOUCH *(see Chapter 26: "SYNCHRONIZATION", section 6 and Chapter 27: "UNITOR ...", section 14).*

6.1 Tempo changes while in "SMPTE Sync" mode

One special use of the "Tempo Interpreter" is the automatic simulation (analysis, recording, optimization) of the timing characteristics of other synchronization devices *(see Chapter 27: "UNITOR ...", sections 10.1 "Learn SMPTE/Tap" and 10.2 "Learn SMPTE/MIDI").*

7. Quasi "tempo changing" by altering notes' time positions

The following functions do not affect the tempo display. Instead, they alter the relationships of note positions.

7.1 "Double Speed"

```
Double Speed
Half Speed
```

The "Double Speed" function ("Functions" menu) halves the distance between notes, resulting in the track playing at twice the speed.

"Double Speed", used on 1/8ths at tempo 120 does not play the 1/8ths at 240bpm, but alters the notes to 1/16ths (still at tempo 120).

Note: the internal clock resolution cannot be doubled to match: if you do "Double Speed" then "Half Speed" to a track, the distances between notes will be rounded off to the nearest 1/384th notes.

Tip: try playing in an arpeggio in 1/8ths, then use "Double Speed" once, then once again. This results in a 1/32nds arpeggio.

7.2 "Half Speed"

The "Half Speed" function ("Functions" menu) doubles the distance between notes, resulting in the track playing at half the speed.

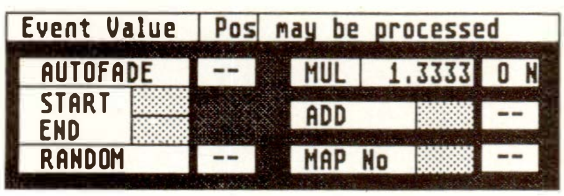
Because the track doubles in length, tracks which are already very long may go over the maximum allowed number of bars (approx 1350).

7.3 Using "Transform" to "change tempo"

The "Double Speed"/"Half Speed" functions double/halve the number of pulses in the note position values. The "Transform" function *(see Chapter 24: "TRANSFORM")* can use other multiplication and division factors to create various "tempi" for each track. Because the calculations can use four decimal places, subtle differences can be achieved.

A multiplication factor greater than 1 spreads a track out, thereby slowing it down. A factor less than 1 compresses it, making it quicker. Because "Transform" can limit changes to segments of a track, tempo changes within a track can be made without touching the tempo display.

Example: install the following in the "Transform" window:



As with the "Half Speed" and "Double Speed" functions, the zero point of the calculations is position "1 1 1 1".It follows that with segments that do not start on this position, apart from compressing or stretching the events' relative time positions, these calculations will also move the segment's start position . If this is not desired, "Segment Copy" the segment to "1 1 1 1" (if necessary in another track), "Transform" it, then replace it where it belongs. To move segments within a track, use "Insert Mode" *(see Chapter 9: "EVENT EDITOR", section 5.1.2 "Insert Mode").*

26. SYNCHRONIZATION

27. UNITOR and the Other C-LAB PERIPHERALS

28. DISK OPERATIONS

29. SOFT LINK MULTI APPLICATION MANAGER

30. APPENDIX

31. INDEX

26. Synchronization

26. Synchronization

1. The basics

Synchronization is the "locking together" of two devices that each have their own internal clocks, so that they run "in sync" together as if they were one device. This is rather like a car (device 1) towing a trailer (device 2). You normally talk about the "master" (the car) and the "slave" (the trailer).

Examples of common synchronization:

sequencer master	drum machine slave
sequencer master	sequencer slave
synchronizer master	sequencer slave
video recorder master	audio tape recorder slave
	etc.

With CREATOR/NOTATOR, if it is the slave of another device (synchronizer, other sequencer etc) we talk about "external synchronization", and the "Sync mode" *(see below)* will be set to "MIDI Sync" mode.

With external synchronization, the Start point and tempo are determined by the other device.

This is so CREATOR/NOTATOR react quickly to commands.

Synchronization is conducted by regular "MIDI Clock" pulses, sent by the master through the MIDI cable whenever it is running.

These MIDI clock pulses are read by the slave, but invisible and inaudible to the user. Each MIDI clock pulse advances the slave by 1/96th note.

2. Choosing the "Sync" mode

Choose the "Sync" mode in the "SYNC" box in the "information bar". Pressing 'Y' or clicking the box gives you:

"internal": the sequencer is not slaved to any external device and runs according to its own tempo.

"MIDI": the sequencer is slaved to an external device, which determines Start point and tempo.

SMPTE": the sequencer runs according to its "Sync Reference" *(Chapter 27: "UNITOR ...", section 6)* using UNITOR as the synchronizer. Here, CREATOR/NOTATOR and UNITOR are a "partnership", not "master" and "slave".

"manual": the sequencer is slaved to incoming MIDI notes and/or acoustic signals, which determine the tempo and Start point according to the "Tempo Interpreter" function *(see Chapter 27: "UNITOR ..." sections 10 and 14).*

Recording can take place whatever the "Sync" mode.

3. "Internal Sync" mode

In the "Internal Sync" mode, CREATOR/NOTATOR's own internal clock determines the tempo: it is "its own master". Incoming MIDI Clock pulses are ignored *(see also Chapter 25: "TEMPO")* since "Clock In" ("MIDI" menu) is automatically disabled.

4."MIDI Sync" mode

In "MIDI Sync" mode, CREATOR and NOTATOR react to all "MIDI System Realtime" and "System Common" messages: "Clock In" ("MIDI" menu) is automatically enabled.

These are "Start", "Stop" and "Continue"; the MIDI Clock pulses that advance the sequencer by 1/96th note per pulse; and the regular "Song Position Pointers" that give information on where the master is in the music, relative to the "1 1 1 1". CREATOR and NOTATOR are able to react to a new position via "Song Position Pointers" whether in Record or Playback modes.

If "Position Pointers" and "Clock In" ("MIDI" menu) are disabled, incoming MIDI Sync data will be ignored.

4.1 "Interpolation" during "MIDI Sync" mode

Although the standard MIDI Clock's resolution is just 1/96th note, CREATOR/NOTATOR retain their 1/768ths (1/1536ths) resolution, even in "MIDI Sync" mode. The resolution of the sequencer is therefore 8 (16) times higher than that of the MIDI Clock.

This is done by something called "Clock Interpolation" *(see Chapter 30: "APPENDIX", section 1.6 "Clock "Interpolation"...").* CREATOR/NOTATOR display the tempo even in "MIDI Sync" mode; if this tempo display is different from that of the master's, it has no bearing on the precision of the synchronization, which is totally locked to the master.

4.2 Simple example of a "MIDI Sync" mode situation

- Connect the MIDI Output of a drum machine to the Atari MIDI Input.
- Switch CREATOR/NOTATOR to "MIDI Sync" mode.
- Start the drum machine.

The drum machine controls the sequencer's Start and Stop points and its tempo.

4.3 MIDI synchronization devices

To synchronize the sequencer to a tape recorder, a synchronizer is needed. It allows the MIDI world to "lock to" the acoustic world of wind instruments, voices etc which are usually recorded on tape. The synchronizer ensures that the sequencer runs at the same speed to and parallel with the tape.

You have basically two choices of synchronizer:

- **the usual external synchronizer that reads time-code and translates it into "MIDI Clock" pulses and "Song Position Pointers": it is used with CREATOR/NOTATOR in "MIDI Sync" mode.**
- **C-LAB UNITOR.**

Using UNITOR to synchronize to an audio or video tape recorder etc means a particularly accurate and easy way of working.

UNITOR is not the usual type of "SMPTE-to-MIDI synchronizer": it bypasses MIDI Clock altogether by communicating directly with the computer, making it much faster than a "normal" synchronizer that has to translate SMPTE into MIDI Clock pulses - its response rate is some 1000 times quicker *(see Chapter 27: "UNITOR ...").*

External MIDI synchronizers divide into two camps:

- those that read SMPTE timecode, and
- those that do not (but read FSK or other time-codes).

These days, synchronizers that do not use SMPTE usually use a method similar to SMPTE to allow starting halfway through the music; they are also slightly cheaper than SMPTE synchronizers. However, their codes are not universal and cannot be read by other makes of synchronizer.

SMPTE timecode, recorded on one of the tape's tracks, tells a synchronizer what the tape position is at the tape machine's replay head, in terms of absolute units of time *(see Chapter 27 for more SMPTE details).*

The synchronizer translates the SMPTE position into musical terms (bar, beat etc) and sends the data as "Song Position Pointers" to the sequencer. The sequencer positions itself accordingly and runs in sync with the tape, locked by the MIDI Clock pulses. SMPTE synchronization means being able to start the tape at any position and the sequencer will react after about 2 seconds (UNITOR is much faster!).

The user must program certain information into the external synchronizer: the Start time at which the sequencer should Start (sometimes called the "SMPTE Offset"); the Start tempo, and any tempo changes; the SMPTE frame rate.

Read your synchronizer's manual carefully.

On the whole, SMPTE synchronization is reliable, though video tape recorders other than "U-Matics" are prone to dropouts *(VITC code is more reliable: see next Chapter on STEADY EYE).*

To be able to record in the sequencer when using an external synchronizer, the synchronizer must have a MIDI In port to attach to the master keyboard's MIDI Output. This is because the Atari's MIDI Input is occupied by the cable from the synchronizer's MIDI Output.

Note: external synchronization via MIDI Clock pulses does not allow positions earlier than bar 1. The "Song Position Pointers" do not allow negative values, and the MIDI "Start" command includes a command to "jump to bar 1".

The actual <u>internal</u> start point within the sequencer can always be freely decided. For instance, the first entry of the arrange list could have a start-bar of "2", which would allow a one-bar count-in at the beginning of the piece, even in "MIDI Sync" mode.

4.4. Recording in "MIDI Sync" mode

CREATOR/NOTATOR can record during "MIDI Sync" mode.

"STOP ends Record" in "MIDI Thru" ("MIDI Menu") determines whether stopping the tape should automatically end a recording *(for details on "Stop ends Record" please read Chapter 21: "OVERALL SETTINGS", section 4 "STOP ends Record").*

4.5 Recording data from other MIDI sequencers

Music can be recorded from any other MIDI sequencer. Do as follows:

1. Connect the other sequencer's MIDI Out port to CREATOR/NOTATOR's MIDI Input.
2. Switch CREATOR/NOTATOR to "MIDI Sync" mode.
3. Select an empty track and click "RECORD".
4. Start the other sequencer.

So long as the other sequencer is issuing MIDI Clock pulses and starts with the correct MIDI Start command, all the notes and events will be recorded into CREATOR/NOTATOR's selected recording track. The MIDI Start command includes the command "jump to bar one", so CREATOR/ NOTATOR will ignore any count-in and go straight to its "1 1 1 1" on receiving the command.

If you need to record segments which are not at the start of the piece (ie any segment that does not start at "1 1 1 1"), use the Main Bar Counter to select the segment's start point in CREATOR/NOTATOR and click "DROP"; in the other sequencer, select the same segment start point, and start it with its "CONTINUE" command.

The tempo at which the transfer takes place is not so important, and can be altered subsequently. The quicker the tempo, the sooner you will be finished; the slower the tempo, the more accurate the recording will be where large quantities of data are involved or where timing is critical. Where the transfered data was quantized in the other sequencer, it should be quantized again in CREATOR/ NOTATOR using a small amount of time correction, say, "QUANTIZE" "96" to ensure that all is well with the timing.

In general, there tends to be a delay of one to two pulses in the transmitted data (you can see this in the event list). Instead of quantizing, you may prefer to use "Insert Mode" to move the whole track earlier *(see Chapter 9: "EVENT EDITOR", section 5.1.2).*

After the transfer, you will be left with one very long track and a lot of free tracks in CREATOR/ NOTATOR, though this will sound no different than before. If you want to do further work on the music, use "Demix All Channels" *(see Chapter 18: "COPY, MERGE, ...", section 7.1)* to split up the data in the recorded track into its constituent MIDI Channels, but this can only be done if the other sequencer's tracks were assigned to different MIDI Channels before the transfer. You should do this, even if you did not actually use all those Channels to control instruments from the other sequencer. Alternatively, you could transfer the data track by track if you have the time and the patience to do so.

4.6 "Start/Continue + 1/96th note"

```
Start    +1/96
Continue +1/96
```

"Start +1/96 Note", "Continue +1/96 Note" ("MIDI" menu): these should not be ticked unless there is reason for doing so. Unticked, they conform to MIDI protocol.

If enabled, CREATOR/NOTATOR add one MIDI Clock pulse (1/96th note) to the incoming MIDI Clock data at each Start or Continue command they receive when in "MIDI Sync" mode (so they will always be 1/96th note ahead of the master device).

These options were conceived for devices which are now consigned to the history books.

5. "SMPTE Sync" mode

"SMPTE Sync" mode is reserved for C-LAB UNITOR *(see Chapter 27: "UNITOR ...")*.

6. "Manual Sync" mode and the "Tempo Interpreter"

In "Manual Sync" mode, the sequencer's Start point and tempo are calculated as a result of the realtime analysis of time positions of incoming MIDI notes. If HUMAN TOUCH is connected, incoming audio or click signals can be analyzed in the same way.

The synchronization here is relatively "loose", ie if the external sync signals stop, the sequencer can continue under its own steam using its internal Clock. The "Tempo Interpreter" controls what happens live in "Manual Sync" mode.

The "Tempo Interpreter" can also be used in conjunction with UNITOR via the two "Learn Modes" "MIDI/SMPTE Learn" and "Tap/SMPTE Learn" ("Options" menu). Here, the tempi of the incoming MIDI notes or audio signals are set against the incoming SMPTE timecode to create a "Sync Reference" *(see next Chapter)*.

6.1 The basics

The "Tempo Interpreter" stands the normal situation on its head: it's not you having to play to the sequencer, but the sequencer that follows your tempo. The use of HUMAN TOUCH even allows the tempo to follow either acoustic instruments via microphone or audio signals off tape.

In "Manual Sync" mode, CREATOR/NOTATOR will automatically set the tempo according to a realtime analysis of the timing of incoming MIDI notes or audio signals received by HUMAN TOUCH. The "Tempo Interpreter" can read tempo and sync information from even relatively complex signals and rhythms. You do not have to play exact quarter/eighth etc notes - even chords and a rhythmical style of playing will be acceptable to the "Tempo Interpreter", and any pauses will be bridged.

The basis of how it works is as follows: you enter a "Tap Step" of, say, a quarter note into the "Tempo Interpreter" window. Like any musician, it can then work out approximately when it can expect the following quarter notes. Every "tap" or signal that falls outside that expectation will be ignored. If the quarter note tap/signal arrives more-or-less on time, the "Tempo Interpreter" will accept it and alter the tempo to suit. If the tap came a little early, the tempo will increase;if late, the tempo will decrease. How "forgiving" the "Interpreter" is in accepting tap inputs is defined by the "Window" setting. For example, 8/768 (= 1/96th note) means that the timing of the tap can waver up to 1/96th note either side of the "ideal" quarter note.

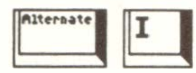
Especially where the taps are relatively imprecisely played in by hand, it makes more musical sense to "buffer" the response of the CREATOR/NOTATOR tempo by selecting smaller values in the "Tempo Response" box; you may even limit the amount by which the tempo can change ("Max Tempo Change").

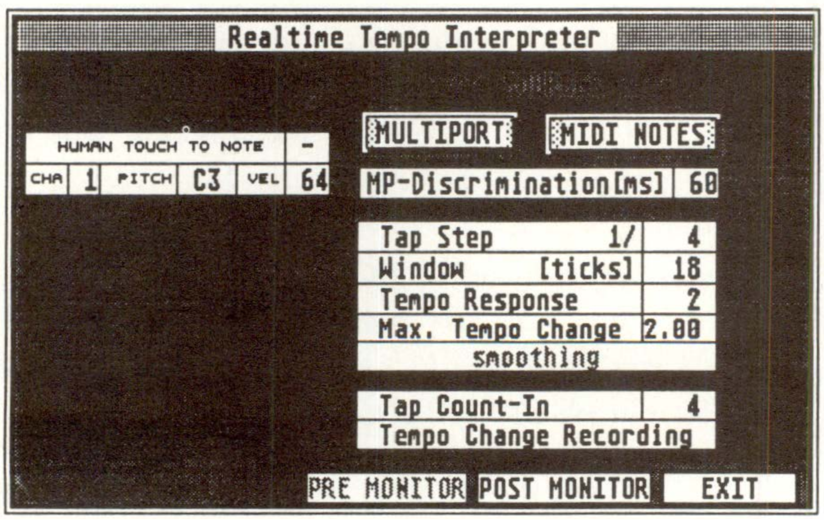
6.2 "Tempo Interpreter" window

The "Tempo Interpreter" is activated by switching over to "Manual Sync" mode (press 'Y').

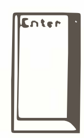
The "Tempo Interpreter" can be addressed by playing any MIDI keyboard or via HUMAN TOUCH.

To open the "Tempo Interpreter": click in the "Options" menu, press 'Alternate-I' or left-click the "OVERFLOW" box below the pattern window.





Like "CONTINUE", a Start command via the "Tempo Interpreter" continues from the current position of the sequencer. In most cases, you will need to ensure that the Main Bar Counter is set to "1 1 1 1" (eg by pressing 'Enter' twice).



If there is a value in the "Tap Count-In" box, the sequencer will wait for the given number of taps before starting at the interpreted tempo.

SOURCES: the two icons "MULTIPORT" and "MIDI NOTES" select the source of the tempo information. They can be active at the same time to allow combined sources.

If "MIDI NOTES" is active, the timing of every incoming note is analyzed.

If "MULTIPORT" is active, the timing of audio or click signals via HUMAN TOUCH is analyzed *(see Chapter 27: "UNITOR ...", section 14).*

MP-DISCRIMINATION: applies only to "MULTIPORT" signals. It shows the number of milliseconds that have to pass after an audio signal, before the "Tempo Interpreter" will accept a new one ie signals that follow on too quickly will be ignored *(see also Chapter 27, section 14).*

The following parameters allow the conditioning of the tempo response. The more rhythmically complicated the source of taps or signals, the more care has to be taken in setting these parameters:

TAP STEP: sets the nominal step timing of the inputted tap information. It has been shown that a larger, rather than a smaller "Tap Step" value gives better results: 1/4th note steps is a setting that suits most situations. When altering the value, the "Window" value automatically defaults to a suggested setting.

WINDOW: the width of the window is in pulses (1/768th [1/1536th] notes). Tap inputs will be accepted for tempo interpretation only if the incoming taps fall within the "Window" range (the value shows the range either side of the ideal, exact tap step). Taps that fall outside the range (ie which probably make no musical sense) will be ignored. The narrower the window, the more the "Tempo Interpreter" will resist the tempo influences of taps that come in between the "official" steps. If the Window is set wider, then stronger, even abrupt tempo changes can be accepted.

Normally, there is a "fly-wheel" effect: the sequencer will continue playing at the last-received tempo value if the taps stop coming in. If you click the name "Window" to disable the function: the sequencer will immediately stop at the nearest 1/16th note if the taps stop coming in.

TEMPO RESPONSE: is where you set the sensitivity to tempo changes. It is helpful to reduce this sensitivity to around "2" if the timing of the taps is relatively imprecise.

MAX TEMPO CHANGE: sets the maximum amount by which the tempo is allowed to change at each tap. In very critical situations (eg where a mixed piece of music is being taken as the master tempo-giver via UNITOR/HUMAN TOUCH), it can make sense to take time to ascertain as accurately as possible the tempo of the piece, to set this tempo in CREATOR/NOTATOR's "TEMPO" box in the main page, and to use "Max Tempo Change" to limit any changes to the barest minimum (providing, of course, that the music being used as master tempo-giver has no tempo changes of its own).

SMOOTHING: should be used in a "live" situation, since jumps in tempo are smoothed out. When synchronizing to tape using "Manual Sync" mode, "Smoothing" should be switched off by clicking the name to grey, so that the sequencer is as close-coupled to the master as possible.

TEMPO CHANGE RECORDING: a switch which allows the tempo changes to be recorded (as P_USER 1 events) in the current track if in Record mode.

PRE MONITOR/POST MONITOR: it can help to have an acoustic "click" over the computer monitor's loudspeaker, especially incritical applications involving HUMAN TOUCH inputs.

If "PRE MONITOR" is enabled, every signal input, whether it falls inside or outside the "Tempo Interpreter" window, generates a high click.

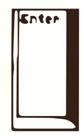
If "POST MONITOR" is enabled, only those signals that fall within the "Window" will receive a low click.

An acoustic input via HUMAN TOUCH is at its optimal level when you are able to hear, via the PRE MONITOR clicks, a clear indication of what the tempo is doing. Always try to produce the clearest possible tempo signals to avoid spurious information being received at the "Tempo Interpreter".

There is also a visual feedback on the main page:

- PRE MONITOR signals in the "MIDI THRU" box.
- POST MONITOR signals in the "SMPTE" box. Both boxes are below CREATOR/NOTATOR's pattern window.

TAP COUNT-IN: like a live musician, CREATOR/ NOTATOR can be instructed to wait for a tapped count-in before playing. This count-in also gives the tempo setting for the start of the piece. The normal tempo setting on CREATOR/ NOTATOR's main page will be overruled by the tempo you have given during the tap count-in.



Example: Tap Count-In 4, Tap Step 1/4 means that four quarter notes must be played in, and the sequencer will start on the fifth. First reset the Main Bar Counter by pressing 'Enter' twice.

If the Tap Count-In value is set to "zero" (blank), the very first tap/audio signal will start the sequencer (equivalent to the "Continue" command). The start tempo, in this case, is the one in CREATOR's main tempo display.

HUMAN TOUCH TO NOTE: an incoming audio signal or click can be made to trigger any MIDI note of any connected synthesizer. *(see Chapter 27: "UNITOR ...", section 14.3).*

6.3 Examples of the "Tempo Interpreter"

Example 1: the sequencer must be counted-in via a MIDI keyboard, so as to give the correct tempo. Set the following parameters in the "Tempo Interpreter":

Tap Step:	4
Tap Count-In:	4
MIDI NOTES:	On
Window:	0

Play five single notes at the desired tempo on the MIDI keyboard. If you do not wish to start with this method each time, now press 'Y' to switch over to "Internal Sync" mode.

Example 2: the tempo is to be influenced by your playing while the sequencer is playing. You want to play with chords note values that are not exact quarter notes; add the following values to the above example:

Window:	18
Tempo Response:	2
Max Tempo Change:	1

Example 3: you want the tempo to exactly follow your tapping as you slow down and speed up. Play single notes only, and play carefully and clearly:

Window:	100 approx
Tempo Response:	8
Max Tempo Change:	9.99

7. MIDI Clock data at the Output

In every "Sync" mode, CREATOR/NOTATOR send the standard "MIDI System Realtime/ Common" commands to one of the Outputs: Start, Stop, Continue, MIDI Clock pulses and "Song Position Pointers".

The "CLOCK PORT" chosen to transmit this data is selected in the "MIDI Thru" window ("MIDI" menu, or click the "MIDI THRU" box below the pattern window).

Other drum machines, MIDI sequencers etc can therefore be slaved to CREATOR/NOTATOR. Not all devices can react to changes in position while running, since MIDI Protocol usually only allows positioning in stop mode.

7.1 Filtering the MIDI Clock at the Output

All the "MIDI System Realtime" messages can be prevented from being output by deselecting "Clock Out" ("MIDI" menu). Normally, leave these enabled.

There is no point in disabling the "MIDI Clock Out" thinking this improves "MIDI timing". You will save only one byte per 1/96th note (1/3000th second or 320 microseconds), which is one third of the time taken by a Note On event: at a moderate tempo, this means one hundredth of a 1/96th note or 1% of the capacity of MIDI. Clocks are in any case strictly regular and cannot lead to irregular variations in timing.

Disabling "MIDI Clock Out" stops a drum machine jumping into "Play" if all you want to do is use it as a source of drum sounds.

If a second sequencer is slaved to CREATOR/NOTATOR using cables going in both directions, disabling CREATOR/NOTATOR's MIDI Thru function ("MIDI" menu) prevents MIDI "feedback" within the loop; the second sequencer would otherwise try to send its own commands on receiving CREATOR/NOTATOR's.

7.2 Delaying the MIDI Clock at the Output

"Sync DELAY" in the "information bar" along the top of the screen determines by how much MIDI Clock pulses at CREATOR/NOTATOR's MIDI Output are delayed (positive values) or pushed (negative values).

The value is shown in 1/768th notes, though this changes to milliseconds with "Delay in ms" ("Flags" menu).

This moves slaved devices. Some older devices (eg drum machines) need "pushing" because they react slowly to MIDI Clock pulses: this problem is solved by entering a negative value in the "Sync DELAY" box so the slaved device is brought into time. However, MIDI Protocol does not allow a Start command be be transmitted prior to bar 1: so what actually happens is that there is a quick acceleration of the MIDI Out Clocks pulses at the Start, in line with the selected negative value.

8. Fostex MTC-1 support

Normally, when synchronizing a MIDI sequencer to a tape machine, the sequencer is slaved to the timecode coming from one track of the tape via the appropriate synchronizer (eg UNITOR).

The Fostex R8 tape machine, together with other Fostex tape machines of the same series (from now on we refer to the "R8" only), alters this scenario, in that it is capable of being remotely controlled via MIDI, using the Fostex MTC-1 synchronization unit: a software program containing the appropriate commands is able to control the tape machine's transport and record functions, as well as other functions. One of the major advantages is the ability to locate the tape position according to bar/beat as well as SMPTE time.

NOTATOR/CREATOR Version 3.1 support the Fostex MTC-1, allowing control of the R8 from the main page and RMG.

NB: this C-LAB operation does not use "MIDI Timecode" ("the MIDI version of SMPTE").

8.1 Hardware and connections

For successful remote control, you must have both the Fostex MTC-1 and the C-LAB UNITOR, as well as the ST computer (with 1 Megabyte RAM minimum), CREATOR or NOTATOR, and the Fostex R8 or similar. One tape track must be striped with SMPTE LTC timecode.

Connections: connect the MTC-1 to the tape machine. Using your mixing desk's patchbay, or a Y-connector, connect the code coming from the timecode track both to the MTC-1 LTC IN port and UNITOR's SMPTE IN port. Connect one of the MIDI ports A to F to the MTC-1 MIDI IN port, and switch the "Clock Port" in NOTATOR/CREATOR's MIDI Thru window to the port you are using.

8.1.1 Signal flow

Many of NOTATOR/CREATOR's commands additionally transmit MIDI System Exclusive data to the MTC-1. These messages concern the transport commands, as well as information regarding the sequencer's position. The MTC-1 interprets these messages and sends them to the R8 which immediately obeys: eg if the Play command is received, the timecode on the tape track is sent to UNITOR and to the MTC-1, a process which guarantees the best possible synchronization between sequencer and tape machine.

8.1.2 Preparations

The Song in NOTATOR/CREATOR must, as normal, contain a Sync Reference, and the sequencer must be set to "SMPTE LTC" sync mode. Keystroke 'Shift-F' activates a special "Fostex mode". The information is saved with a Song.

Place the tape machine or its detachable command panel within view (though not necessarily within reach!).

8.2 Tape transport

In "Fostex mode", NOTATOR/CREATOR's transport commands enter a form of "Local Off" status: pressing "Start" on the sequencer starts the sequencer by issuing a Play command to the R8, setting the tape in motion, which has the effect of setting the sequencer in motion because it is in SMPTE Sync mode and is receiving timecode via UNITOR; in other words, the "Start" command does not start the sequencer internally: only via the Fostex.

In Fostex mode:

"Start" starts the Fostex from current TAPE position (like "Continue").

"Stop" stops the tape. Using "Stop" again rewinds the tape to the beginning.

Positioning: almost every positioning function will control the tape: clicking in the GAM's bar ruler; left-clicking a locator; using "<<<" and ">>>" to make the tape location jump to the next arrange entry; "<<" and ">>" will make the machine fast-forward/reverse while the mouse button is being pressed – if the sequencer and tape were already playing, you will hear the music "cue" forwards or backwards; clicking the Main Bar Counter; recalling stored locator positions via the Function keys, etc.

While the tape is spooling, the sequencer is in Stop mode. The tape will go to the desired position minus the pre-roll (count-in) time, to ensure that the beginning of the desired section is played.

Some operations automatically drop NOTATOR/CREATOR out of SMPTE Sync mode back into Internal Sync for working without tape: the "GAM Scrub mode", the Continue command and the event editor CUE function.

8.3 Record

To put a Fostex track into Record Ready status, click the corresponding CREATOR/NOTATOR track number while holding 'Shift'. A right-click puts the track back into Safe status. Pressing 'Alternate' while clicking a track puts that track into Record Ready status and simultaneously puts all other tracks into Safe status.

Then, to route the signal to the Input Monitor of the selected tracks, press '*' or click "Record" while pressing 'Shift'. Using "Record" again starts the recording from the tape's current position. If already in Play mode, the Record command allows manual punching in/out to take place.

Particulary useful is the combination of Cycle and Autodrop (enable both modes!), as punch in and out points can be preprogrammed. The desired amount of "pre-roll" can be set in the Count-in window ("Option" menu). After a successful "Cycle Autodrop" operation, the R8 will drop out of Record mode an grounds of safety.

Tip: depending on the Fostex model, the drop-out command may be slightly delayed. To avoid recording over material that follows the drop-out point, make the right locator position a little earlier than required: you will need to experiment to find the necessary value, which changes according to the song tempo.

NOTATOR/CREATOR's "Drop-merge" ('Spacebar') functions as before, allowing a MIDI recording to take place at the same time as a tape recording (ie recording analogue and digital simultaneously!).

8.4 Remote control

In principle, every Fostex function can be controlled via SysEx data. The RMG's freely-definable control elements can be used by advanced MIDI SysEx users to configure their own user-interface: the required MIDI information is obtainable from Fostex.

In this context, the C-LAB MIDIA program is very helpful: its Byte Calculator can translate hexadecimal and binary code and create SysEx messages which can then be tested on the MTC-1. SysEx files can then be saved as a track (".SEQ" file) for loading into NOTATOR/CREATOR.

Putting tracks into Record Ready, activating the "Input Monitor" mode and much more can be remotely controlled from the RMG's switches and faders. Especially critical punch procedures can be preprogrammed by entering the corresponding P_USER events in the event list.

You may even "remote control the remote control" by using Realtime Transform to, say, select the track number via Program Changes, drop in/out via a sustain pedal, etc.

27. Unitor and the other C-LAB Peripherals

27. UNITOR and the other C-LAB Peripherals

1. UNITOR: the basics

The capabilities of CREATOR and NOTATOR are vastly enhanced by the addition of dedicated hardware:

UNITOR C for CREATOR
UNITOR N for NOTATOR.

UNITOR combines four distinct functions:

1. SMPTE/EBU synchronization
2. MIDI communication
3. Multiport for connecting HUMAN TOUCH or STEADY EYE
4. Built-in dongle

The SMPTE synchronization is made possible by SMPTE timecode. Because of CREATOR/NOTATOR's extremely high tempo resolution, the length of a piece of music can be worked out to the nearest few milliseconds, allowing, for instance, the simulation of timing characteristics of other synchronizers.

TWO ADDITIONAL MIDI OUT PORTS ("E" and "F"), together with the ST's existing MIDI Output ("A"), treble the number of MIDI Channels and the speed of transmission. Adding EXPORT to the system gives six MIDI Outputs with a total of 96 MIDI Channels.

TWO ADDITIONAL MIDI IN PORTS ("II" and "III"), together with the ST's existing MIDI Input ("I"), allow the MERGING of three distinct sources of MIDI data simultaneously.

There are no controls on UNITOR: all commands are in CREATOR/NOTATOR.

Never insert or remove UNITOR without first switching the computer off.

2. MIDI Outputs E and F

UNITOR has two additional, individually independent MIDI Outputs: "E" and "F".

In CREATOR/NOTATOR, each track's "CHANNEL" parameter allows the selection of an Output. Because each of the 6 Outputs has 16 MIDI Channels, adding UNITOR and EXPORT increases the available Channels to 96. Without EXPORT *(see section 16)*, there are 48 Channels over Outputs A, E and F *(see also Chapter 6: "TRACKS", section 3, where the advice also applies to Outputs B-F)*.

Even if there are more than enough Channels, the MIDI devices should be spread out over the available Outputs for timing reasons. Timing is improved when data is transmitted in parallel over different ports.

If UNITOR and EXPORT are in use, "critical" instruments (used for drum sounds) and heavy MIDI data loads should be transmitted over Outputs A, B, E and F.

In this configuration, Outputs C and D on EXPORT should be used for single instruments only.

3. MIDI Inputs II and III

UNITOR has two additional MIDI Inputs: "II" and "III". Input "I" is the ST's existing input.

MIDI signals are filtered and "realtime Transformed" before being MERGED into the record track and then re-transmitted according to the MIDI Thru function and realtime ghost tracks *(see Chapter 23: "REALTIME MIDI FUNCTIONS")*.

4. What are SMPTE, EBU, Frame rate, frame, bit?

"SMPTE" is an acronym for "Society of Motion Picture and Television Engineers": they perfected this timecode for use in synchronizing sound to picture in the USA film industry.

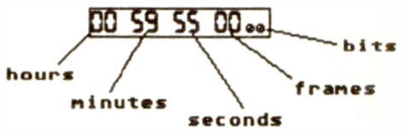
This code is now an audio-industry standard: SMPTE timecode is used in almost every professional context, even outside the film industry.

4.1 SMPTE/EBU timecode format

SMPTE contains information about the exact "time-of-day" position of (in our case) the tape at the tape machine's replay head:

hours - minutes - seconds - frames - bits.

CREATOR / NOTATOR display this "time-of-day" as follows:



SMPTE's hours, minutes and seconds are self-explanatory: it is a 24-hour clock, each hour is 60 minutes, each minute is 60 seconds.

"Frames" are divisions of a second.

A frame consists of 80 "bits". One bit corresponds to 500 microseconds (1/2 millisecond) at a frame rate of 25 frames/sec.

The bit is the smallest unit of time in the whole system; the SMPTE OFFSET (when the music starts) can be shifted in these units.

4.2 Frame-rate

The "frame-rate" defines the number of (picture) frames per second.

There are differing frame-rates around the world, even within each branch of the entertainment industry.

American monochrome television has adopted 30fps ("frames-per-second"). When colour television was introduced, the picture frequency was set at 29.97 Hz, which caused a lot of difficulties when synchronizing; the "30 Drop Frame" standard was introduced to overcome them, by leaving out a frame every so often. All the other frame-rates are "non-drop".

In Europe, the frame-rate standard is 25fps, both for monochrome and colour television. Strictly-speaking, the 25fps timecode should be called "EBU" instead of "SMPTE", since it was adopted by the European Broadcasting Union, but everyone tends to call all four codes "SMPTE".

Lastly, the film industry uses 24fps.

4.3 The various frame-rates

Frame-rate	Frames/sec	One Frame [ms]	One Bit [micro sec]	Bits/sec [Hz]
24	24	41,67	520,8	1920
25	25	40,00	500.0	2000
30 Drop	29,97	33,36	417,1	2400
30 Non-Drop	30	33,33	416,7	2400

5. Choosing the frame-rate

If UNITOR is being used purely for audio production, use a 25fps frame-rate in Europe (30fps in USA), though strictly-speaking it does not matter so long as UNITOR is set to the tape's fps.

In video/film production, it is important to know the frame-rate of the medium being used, and to install it in the "Sync Reference" window.

It is vital that all the tape in a production should have the same frame-rate so that all the machines lock together.

IMPORTANT: the frame-rate set in the Sync Reference must match the frame-rate being read off the master. UNITOR cannot function correctly if the two rates do not match.

The "SMPTE" box below the pattern window will show regular speckled beams if the wrong frame-rate is set in the "Sync Reference".

6. Basics of SMPTE sync, "Sync Reference", SMPTE Offset

A track of the audio multitrack is reserved for the SMPTE timecode.

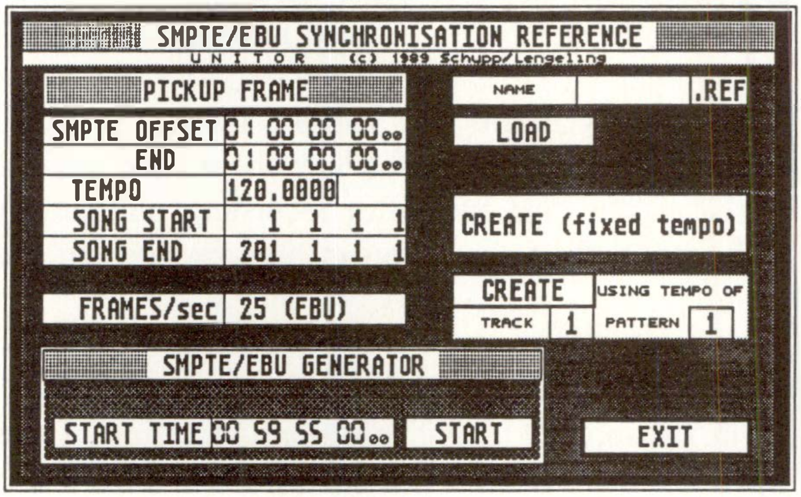
UNITOR's job is to establish a clear and solid relationship between the position of the tape and the sequencer's bar position, and to maintain it as accurately as possible.

The information which does this job is contained in the program's "Sync Reference", which includes:

- **the timecode frame-rate**
- **the SMPTE Offset (the tape's position relative to where the song starts)**
- **the song's tempo, or changes of tempo.**

Almost all synchronization settings are carried out in the "SMPTE/EBU Synchronization Reference" window ("Sync Reference" for short).

Open this window via "SYNCHRONIZATION" ("Options" menu), clicking the "SMPTE" box below the pattern window or pressing 'S'.



A Sync Reference, once "created", forms part of a CREATOR/NOTATOR song (use "Load/Save SONG" in the "File" menu). It can also be saved/ loaded separately *(see section 11).*

UNITOR reads the SMPTE code coming from the tape. According to the current tape position and the "Sync Reference" data, the song's exact position is calculated and the music played.

Having SMPTE information in absolute units of time combined with a "Sync Reference" has three distinct advantages compared to other sync methods:

1. Ease of use: you can start synchronizing wherever you like, even halfway through the music.
2. Reliability: mistakes such as drop-outs in the timecode can be recognized and corrected "on-the-fly".
3. Editing: by altering the SMPTE Offset, the music in the sequencer can be moved in time against the master tape even after recording, and can be lengthened or shortened in time by altering the tempo.

Furthermore, menu "Position in Frames" ("Flags" menu) displays all time positions in terms of the SMPTE tape position *(see Chapter 5: "POSITIONING", section 1.4.2 "Position in frames")*.

This allows you to exactly match music/effects to a video cue *(see Chapter 9: "EVENT EDITOR", section 5.1.3 "Pickup clock")*.

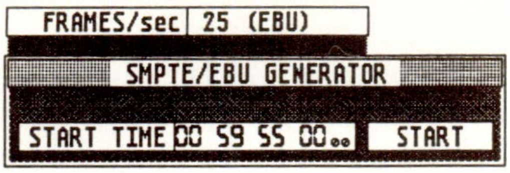
7. Generating SMPTE/EBU timecode

Recording ("striping") timecode onto a multitrack tape or cassette should be done before any music is played on it; it is best to stripe the whole tape in one go. Use one of the edge tracks (normally the highest one) to minimize cross-talk. Do not use the neighbouring track for percussive or bass-heavy sounds. This may corrupt the timecode due to cross-talk.

Connect UNITOR's "SMPTE OUT" 1/4-inch jack socket to the tape machine's track input. UNITOR's output level is set at -6 dBm (0 dBm = 0.775 V). UNITOR can deliver balanced (stereo jack) as well as unbalanced (mono jack) signals.

The recommended level to tape is between -10 to -6 dB VU on professional machines, and -3 to 0 dB VU on cassette machines. Switch out any noise reduction (especially "dbx") on the timecode track before recording.

To generate the timecode, set the frame-rate ("FRAMES/sec" box) and the "GENERATOR START TIME" in the "Sync Reference" window, then click "START". Press any key to end the striping.



There is no set rule as to what the start time of the timecode on tape should be, but most studios start the timecode at 00:00:00:00 (hour: minute: second: frame), then make the Offset 00:00:20:00 at which the sequencer starts.

You could also start generating at 00:59:55:00, and make the Offset 5 seconds later at 00:01:00:00, which is a nice round value.

Do not generate timecode starting after around 23:00:00:00, since "midnight" causes problems. Apart from that, the time of the timecode on tape is relatively unimportant since the Offset in the "Sync Reference" can start the music start at any time.

IMPORTANT: you must generate the correct frame-rate: UNITOR cannot subsequently read it at a different rate. If in doubt with audio to audio, choose 25fps in Europe and 30fps in America.

7.1 Phase-synchronous timecode

Using UNITOR (without STEADY EYE) in video work, the SMPTE timecode on the video sound track is not "in phase" with the picture. This applies to all other similar SMPTE synchronizers. In other words, a "frame" of the timecode is not necessarily at exactly the same position as a video "frame".

The question whether the music and video are locked frame-to-frame is important if at some point there will be some electronic editing or "laying-in" of the music to video: if sound and picture are phase-locked, no problems.

To be able to generate SMPTE timecode synchronized, frame-to-frame, to the video picture, UNITOR with STEADY EYE can read and analyze the video signal itself. This needs only doing once, in order to generate the synchronized SMPTE timecode which is then recorded directly onto the video's audio track.

What happens is that STEADY EYE reads the incoming video's "frame edge" information and locks the outgoing SMPTE timecode's frames to them. It is not receiving any "time" information, only locking information.

(In addition, STEADY EYE can read "VITC" timecode, but this is unrelated to the above feature. "VITC" timecode must be already inserted on a video for STEADY EYE to be able to read it, but it allows CREATOR/NOTATOR to remain locked to the picture even in freeze frame and slow-motion play. VITC, by definition, frame locks the program to the video with the advantage of dictating the "time-of-day". Please consult the STEADY EYE manual.)

8. SMPTE synchronization

8.1 "Creating" a "Sync Reference" without tempo changes

What to do:

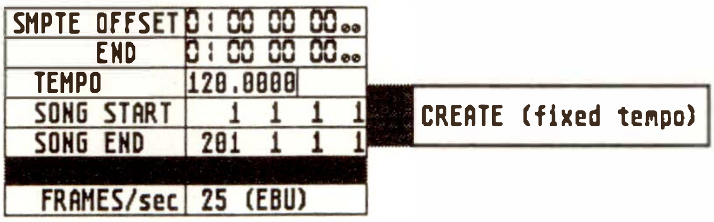
1. **There must be SMPTE timecode on tape.**
   (If there is none, read section 7.)

2. **Connect the tape machine's SMPTE track output to UNITOR's "SMPTE" Input.**

UNITOR's input will work with balanced (stereo jack) and unbalanced (mono jack) signals at between -20 to +6 dBm. It is best to take the timecode straight from the tape machine without going through the mixing desk to get as clean a signal as possible.

To check that UNITOR is receiving timecode, switch to "SMPTE Sync" mode and ensure the correct frame rate is set in the "Sync Reference" window: when the tape is rolling, you should see the SMPTE time displayed in the "elapsed time" box in the "information bar". As the "Sync Reference" is missing at this stage, CREATOR/NOTATOR will not start.

3. Create the "Sync Reference" in the "Sync Reference" window: press 'S' and install the following parameters:



"SMPTE OFFSET": the SMPTE time at which the sequencer should start. Commercial studios tend to set this 20 seconds after the beginning of the timecode which is on tape, and 20 seconds or more after the end of a previous song *(see also section 6).*

"SMPTE END": this is just a display, it cannot be changed with the mouse. The value shows the SMPTE time equivalent of the "SONG END" value below, and is automatically set when either of the "CREATE..." boxes is clicked.

"TEMPO": this is the main page tempo which will become part of the "Sync Reference". Alter it to the desired value.

"SONG START": determines where in the song the sequencer should start when the SMPTE OFFSET time is reached. This is almost always "1 1 1 1", though bar positions later or earlier are possible.

"SONG END": determines when the song should stop. This bar position is almost never used and should be left at the default 201 bars, unless you need greater length. There is nothing to be gained by making the "SONG END" the same position as, say, the Stop pattern (zero) in the arrange list.

4. Ensure the frame-rate is correct and click the "CREATE (fixed tempo)" box.

Once "CREATE..." has been clicked, the "PICKUP FRAME" icon now reads "Sync Reference exists", and two boxes appear in the window:

- "DELETE" allows the "Sync Reference" to be deleted.
- "SAVE" *(see section 11 "Saving and loading a "Sync Reference").*

"EXIT" returns you to the main page, where you should set "SMPTE Sync" mode on the main page. Done!

Now any start of the tape within the SONG START and SONG END positions will start CREATOR/ NOTATOR at the correct position, which will run very accurately with the timecode.

If nothing happens, check that CREATOR is receiving timecode by looking at the "elapsed time" display in the "information bar": if it is not, check all your hardware connections; if it is, check that the "SMPTE OFFSET" value is correct in relationship with the timecode coming in.

All the tracks on the tape (except for the sync track) can now be used. You may find it useful, even if you will always be running the program in sync with the tape while you record any voices or acoustic instruments, to make a rough submix of the MIDI instruments onto one track of the tape so that the program does not have to be there all the time while you record non-MIDI stuff.

Always record your music after the SMPTE timecode is recorded. Having to synchronize to music that was recorded without a sync track is possible, but best avoided if possible.

Tip: even when the program is stopped, while in "SMPTE Sync" mode it must always be watching its SMPTE Input for signs of timecode. If you are not using SMPTE for some time, it makes sense to switch into "Internal Sync" mode, which puts the program into its fastest mode of working.

8.2 "Creating" a "Sync Reference" with tempo changes

There are two ways of creating a "Sync Reference" with tempo changes: if all the tempo changes *(see Chapter 25: "TEMPO")* are contained in one track, use the following method. If tempo changes are spread around different tracks and patterns, use "Learn SMPTE/Internal" *(see section 10.3).*

Please read the above section on creating a "Sync Reference" without tempo changes, which applies here apart from the tempo and "CREATE" information:

1. **There must be SMPTE timecode on tape.**
2. **Connect the tape machine's SMPTE track output to UNITOR's "SMPTE" Input.**
3. **Create a "Sync Reference" with tempo changes: place the sequencer's track cursor on the tempo track, press 'S' to open the "Sync Reference" window and install the "Sync Reference" parameters** *(see above section).*

The start tempo is automatically set and will not normally need adjusting. The "Using Tempo Of" box will default to showing the track on which you have left the track cursor.

4. **Ensure the frame-rate is correct and click the "CREATE using tempo of track xx pattern xx" box.**

"EXIT" returns you to the main page, where you should set "SMPTE Sync" mode on the main page. Done!

If you subsequently make any changes to the tempo track, you must click "CREATE using tempo of..." again.

9. Editing a "Sync Reference"

Even during synchronization, the SMPTE Offset and TEMPO (to the nearest fourth decimal place, eg 120.0001) can be changed in the "Sync Reference" window "on the fly".

As a result, alterations are very easy. They have an immediate effect (approx 500 ms) on the synchronization thanks to the program's multitasking capabilities, and there are no timing glitches.

Careful! If a sequence has tempo changes, changing the tempo value in the "Sync Reference" will disable them.

You should not alter a "Sync Reference" without good reason. Ensuring that you start with the correct "Sync Reference" can save you a lot of extra work.

There are situations which will force you to make changes to a "Sync Reference", or even to create one from scratch. The most basic example of this is where you have music on tape whose tempo and start time relative to SMPTE is unknown. The program must be synchronized to this music as closely as possible:

1. If the existing music was created using a synchronizer other than UNITOR, the "Learn SMPTE/MIDI" mode is a very convenient way of transferring the other synchronizer's synchronization information to UNITOR via MIDI *(see section 10.2).*

2. If the existing music was created without using any form of synchronization, the "Learn SMPTE/ TAP" *(see section 10.1)*mode is a convenient way of dealing with this, by definition, difficult situation. This situation also arises when the music was created using a synchronizer, but you do not know which type, or where there is no parallel click track recorded.
3. If the existing music has a constant tempo with no tempo changes, there is a third way of synchronizing the program:

- There must be SMPTE timecode on tape.
- Set the "SMPTE OFFSET" as accurately as possible in the "Sync Reference" window: to do this, set the program to "SMPTE" Sync mode and enter the window. Play the tape from before the music's start (it helps if there is a count-in on tape) and click "PICKUP FRAME" as soon as you hear the beginning of the song. This will enter the current SMPTE time as the SMPTE Offset value.

PICKUP FRAME

- In the "Sync Reference" window, enter the tempo as accurately as possible. This can easiest be done using the "Tempo Interpreter"'s "Tap Count-In", eg "Tap Step": 1/4, "Tap Count-In": 4, so that your four initial taps (plus one) on the MIDI keyboard follow the tempo of the piece you are listening to ("Manual Sync" mode). The tempo is automatically loaded into the "Sync Reference" window.
- Ensure that the "SONG END" setting is generous enough and click "CREATE (fixed tempo)".
- Set "SMPTE Sync" mode on the main page.

At this point the sequencer should be more or less in time with the music on tape.

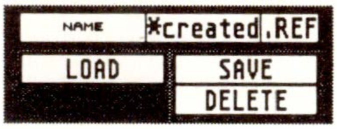
Now "fine-tune" your "Sync Reference" by adjusting both SMPTE Offset and TEMPO. You will need tracks on tape and in the sequencer that can be compared, ideally containing kick drums or cowbells etc.

Adjust the SMPTE Offset value at the beginning of the song, and the TEMPO towards the end of the song: this automatically optimizes the timing in the middle. Repeat both adjustments until you are satisfied with the result.

At this point, the reasoning behind the tempo's four decimal places becomes clear. It allows a 30-minute piece of music to be adjusted a few milliseconds either way, which is why you adjust tempo by listening to the end of the music.

The individual units of tempo and SMPTE Offset (including bits) can be mouse clicked in the usual way. Use of the 'Control' + Mouse feature is recommended for jumps between values *(see Chapter 3: "GENERAL HANDLING", section 1.2)* where in-between values are not touched.

While editing (even tempo) in the "Sync Reference" window, the SMPTE time will be shown in the "information bar".



Alternatively, instead of doing countless adjustments, the "Sync Reference" can be deleted (click the "DELETE" box), new parameters installed, and "CREATE..." clicked again.

10. "Learning" a "Sync Reference"

The "Learn" modes automatically analyze or "learn" incoming tempo characteristics and create a "Sync Reference" accordingly.

```
-UNITOR LEARN MODES-
Learn SMPTE/Tap
Learn SMPTE/MIDI
Learn SMPTE/intern
```

10.1 "Learn SMPTE/Tap"

The "Tempo Interpreter" *(see Chapter 26: "SYNCHRONIZATION", section 6)* itself reads tempo data from the timing of MIDI notes or from audio/ click signals via HUMAN TOUCH *(see section 14)*.

Example 1: to synchronize the program to an existing piece of music, manually tap to the beat in 1/4 notes:

- Connect any MIDI device (keyboard, drum pad, etc) to one of the MIDI Inputs.
- Switch to "Manual Sync" mode and enter suitable parameters in the "Tempo Interpreter", eg:

"MIDI NOTES"	
"Tap Step":	1/4
"Window":	12
"Tempo Response:	1

Now incoming MIDI notes will control the tempo.

- Connect the tape's SMPTE Output to UNITOR's SMPTE Input.
- Reset the Main Bar Counter to "1 1 1 1" and click "Learn SMPTE/TAP" ("Options" menu).

- Start the tape and tap your instrument on the beat.

At the end of the music press "STOP": the "Sync Reference" is now created.

Example 2: to synchronize the program to an existing piece of music, use the available drum track (or better still, a click track) to send tempo triggers via HUMAN TOUCH. This is much more accurate than playing by hand (as in example 1 above):

- Connect the drum track to a HUMAN TOUCH input.
- Switch to "Manual Sync" mode and enter suitable parameters in the "Tempo Interpreter", eg:

"MULTIPORT"	
"Tap Step":	1/4
"Window":	12
"Tempo Response:	1

Now incoming audio signals will control the tempo.

Where the incoming audio signal is complicated, the setting of the "Tempo Interpreter" parameters is critical, especially as concerns the initial tempo of the music. The tempo shown in "Manual Sync" mode can vary slightly from that shown in the "Learn SMPTE/Tap" mode, though this has no bearing on the precision *(see remarks in section 10.2).* The audio signals used should ideally consist of regular percussive sounds from a single instrument. However, even mixed-down tracks of rhythmical music can be equally suitable since the drum track normally stands out reasonably clearly from the accompanying music. Carefully trimming the

audio input can help, as can use of compression, limiting, equalization etc.

Much simpler than this is the reading of a click track, where small drop-outs will be bridged over.

- Connect the tape's SMPTE Output to UNITOR's SMPTE Input.
- Reset the Main Bar Counter to "1 1 1 1" and click "Learn SMPTE/TAP" ("Options" menu).
- Start the tape; the first audio signal to reach HUMAN TOUCH will start the sequencer. Play the tape all the way through and continue beyond the end if possible to allow the new production to go on longer if necessary. If there is a break in the incoming taps or other timing problems, the program will interpret this as an end to the "Sync Reference" and stop: you are given the choice, via a dialog box, of keeping or cancelling the aborted "Sync Reference". Click cancel, and also check in the "Sync Reference" window that no "Sync Reference" has been created: if so, click "DELETE".

At the end of the music press "STOP": the "Sync Reference" is now created. Save the song to save the "Sync Reference".

10.2 "Learn SMPTE/MIDI"

With "Learn SMPTE/MIDI", a "Sync Reference" is automatically created when tempo information from a MIDI Input (in the form of MIDI Clock pulses) is received at the same time as SMPTE timecode via UNITOR.

This mode allows the transfer of timing characteristics of a different synchronizer into UNITOR without the need for additional commands.

This is useful where the music was originally created using a different synchronizer, and you have access to the same model of synchronizer (though now, of course, it's UNITOR you want to use).

- Set up the other synchronizer and CREATOR/NOTATOR ready for synchronization as usual.
- Connect the synchronizer's MIDI Output to one of UNITOR's MIDI Inputs.
- Connect the tape's SMPTE output to both UNITOR's and the synchronizer's SMPTE Inputs, so they receive the same time code (assuming the synchronizer reads SMPTE). Avoid using eq etc if you have to use a mixing desk to split the signal.
- Wind the tape back to before the song start, select "Learn SMPTE/MIDI" ("Options" menu) and start the tape.

The MIDI synchronization gets under way as usual: both units are reading SMPTE, but UNITOR is reading the Clock pulses from the other synchronizer as well to create a "Sync Reference".

When finished, switch the program to "SMPTE Sync" mode and put away the other synchronizer: one run-through was enough for UNITOR to simulate its timing characteristics for that song.

Note: after the above process, synchronization takes place "one generation removed" from the original: the precision of the synchronization is somewhat affected. A slightly "warbling" tempo display, which can also differ slightly from the other synchronizer's display, does not adversely affect the precision of the synchronization; to optimize the synchronizing, these continuous adjustments are desirable. To achieve the most precise synchronization, UNITOR constantly corrects the tempo while reading the SMPTE timecode if there are fluctuations in the tape speed, without altering the "normal" tempo display.

10.3 "Learn SMPTE/Internal"

There are two ways of creating a "Sync Reference" with tempo changes: if all the tempo changes *(see Chapter 25: "TEMPO")* are contained in one track, use the quick method "CREATE using tempo of..." *(see section 8.2).*

If tempo changes are spread around different tracks and patterns, use "Learn SMPTE/Internal".

- There must be SMPTE timecode on tape. Connect the Output of the SMPTE signal from tape to UNITOR's SMPTE Input.
- Enter any "SONG START" position in the "Sync Reference" window (usually "1 1 1 1"). Any existing "Sync Reference" should be deleted to avoid unexpected automatic starts. Check the frame rate.
- Switch to "SMPTE Sync" mode and start the tape. The SMPTE readout in the "information bar" will start to roll.
- When you are ready, press 'Shift-W' ("Recording Sync Reference") or click "Learn SMPTE/Internal" ("Options" menu).

This will start the sequencer, which will run as if in normal "Internal Sync" mode with all the tempo changes. At the same time, the "Sync Reference" is being created. The SMPTE Offset time in the "Sync Reference" window will be determined by when you pressed 'Shift-W'. Afterwards, you can round this off to the nearest second etc, but do not forget to reset the "SONG START" value to "1 1 1 1" as well.

On the other hand, you can pre-select a SMPTE Offset time and press 'Shift-W' before you start the tape, which will put the sequencer into "Waiting for AUTOSTART" mode: it will start automatically on reaching the SMPTE Offset time.

You can even alter the tempo (eg with "mouse as slider") while you are recording the "Sync Reference" - these tempo changes will be directly entered into the "Sync Reference". If you do this, and you already have tempo changes recorded in the song as well, make sure there are no tempo-change conflicts!

- At the end of the song, stop the tape.

The "Sync Reference" now contains all the tempo changes.

Note: if you subsequently make any changes to the tempo, you will need to start the above process all over again. This is why it is preferable, where possible, to contain all your tempo changes within one track and to use the simpler process as described above in *section 8.2 "CREATE using tempo of..."*.

11. Saving and loading a "Sync Reference"

A created "Sync Reference" forms part of a CREATOR/NOTATOR song and will be saved to and loaded from disk via "Save/Load SONG".

A "Sync Reference" can also be named and saved to/loaded from disk separately via "LOAD/SAVE" in the "Sync Reference" window. The file extension is always "*.REF".

If you type in a name that is already on disk, the program will ask you if the old file should be renamed to "*.BEF" before saving the current one.

12. SMPTE trouble-shooting and tips

UNITOR is able to deal with certain timecode problems. Small problems will have no effect on the timing, slightly bigger ones may lead to a slight and very short variation in timing. Very large problems, such as long drop-outs, can lead to the synchronization being aborted. The condition of the SMPTE timecode can be seen by a "beam"-type display in the "SMPTE" box below the pattern window. A good timecode track displays no beam. Small blips are still fine. A large dropout prompts the warning message "Non-contiguous Timecode!"; this will happen only once, after that, it assumes you have heeded the warning. This happens rarely.

To ensure you minimize the error factor, always use good-quality recording tape, ensure the tape machine is aligned and de-magnetized, record and replay at the recommended levels and minimize crosstalk between tape tracks.

UNITOR data (0 dBm = 775 mV):

Output: -6 dBm
Input : -20 to +6 dBm / 10 kOhm

Recommended recording levels:

Studio multitracks 2" and 1":	-10dB to	-6dB VU
Multitracks 1/2" and 1/4":	-6dB to	0dB VU
Cassettes:	-3dB to	0dB VU

You should find out for yourself what the optimum record and playback levels are on your tape machine and on which track the timecode is happiest.

The timecode track is normally recorded on the highest-numbered track. Badly-maintained tape machines can damage edge tracks, so other tracks have to be used for the timecode. Beware, then, of cross-talk, particularly from percussion and bass tracks; the timecode could also bleed to other tracks. The best way is to leave neighbouring track(s) empty.

If a synchronizer is connected to a multitrack with an unbalanced cable, it could lead to earthing between the digital MIDI communication and the analogue audio-paths. This can be heard as a slight crackling when, for instance, the modulation wheel is turned.

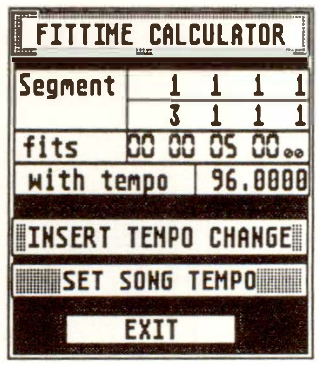
To remedy this, use a balanced jack cable (UNITOR's Input and Output are both balanced and unbalanced).

If the multitrack's Output is unbalanced, instead of using a DI (Direct Injection) box, try the following: at the UNITOR end, solder the earth to the middle ring of a stereo jack plug and the signal wire to the tip, leaving the plug's earth connection free.

This simple balancing operation works only if all equipment (Atari, multitrack etc) is properly earthed.

13. "Fittime Calculator"

The "Fittime Calculator" ("Options" menu) helps answer questions that often crop up when laying sound to picture, such as: "what tempo do I need if a whole 4/4 bar is to last exactly 2 seconds and 17 frames?". You may enter normal musical segments (in bars, beats etc), absolute lengths (in hours, mins, secs, frames and bits) or tempo, and receive the appropriate answer.



"INSERT TEMPO CHANGE" inserts the required tempo into the current track at the beginning of the current segment of music, after which the "Segment" display automatically scrolls forwards to help you insert a logical sequence of tempo changes. If these tempo changes are to form part of a UNITOR "Sync Reference", follow the method described in *section 8.2.*

"SET SONG TEMPO" installs the current Fittime tempo as the main program start tempo.

14. HUMAN TOUCH

HUMAN TOUCH serves two main purposes: to control the tempo of CREATOR and NOTATOR by reading audio signals, and to synchronize external devices via click signals.

14.1 Generating signals

As a method of synchronization, the use of click signals is now out-of-date: its operation is more complicated, and is far less user-friendly (eg always having to start at the top of the timecode) than the later MIDI Clocks with "Song Position Pointers". However, synchronization click tracks can still be a necessity with some older devices.

14.1.1 Click Outputs

HUMAN TOUCH has three independent Outputs which can each give out differing click signals. A single "click" consists of a rising and a falling edge.

A "P_USER 21" event will transmit a single click at any time position, allowing you to assemble any type of click track at any tempo, even with pauses.

```
1  1  1  1 P_USER     21   1HuTouch Click
1  1  3  1 P_USER     22   1 HuTouch HIGH
1  2  1  1 P_USER     23   1 HuTouch LOW
1  2  3  1 P_USER     25   1 Switch DIN
```

P_USER 21's "second data byte" (as seen in the event list's "-2-" column) determines the Output as follows:

HUMAN TOUCH Output	-2-
1	1
2	2
3	4

The same P_USER 21 click can be sent to more than one Output by adding together the respective P_USER values (1, 2, 4):

HUMAN TOUCH Output			VALUE -2-	
1	2		3	(1+2)
1		3	5	(1+4)
	2	3	6	(2+4)
1	2	3	7	(1+2+4)

Eg: *1 1 1 1 P_USER 21 1 HuTouch Click* means a click is sent to Output 1 at the start of Bar 1.

To assemble a click track for sync purposes, simply mouse-enter a few such P_USER events into a track at the desired time positions (using "Segment Copy" can help) and use the "LOOP" track parameter to make up a continuous track.

Example: for 24 clicks-per-quarter note, enter 24 "P_USER 21" events, each 8 1/768th notes apart, within the first quarter note:

1 1 1 1
1 1 1 9
1 1 1 17
1 1 1 25, etc

then set "1" (one beat) as the "LOOP" track parameter on the main page. (This particular 24-click rate can be created even more simply using "P_USER 25" - *see below.*)

Tip: because each click position can be precisely set, swing rhythms can be achieved by the deliberate delaying of every second 1/8th note *(see Chapter 17: "QUANTIZE, ...", section 2 "Groove Design").*

A P_USER's click signal is quite short (sawtooth); some drum machines require a squarewave instead: *see next section on "P_USERs 22/23".*

The most common use for a click-type of synchronization is to slave older drum machines that use the 24-clicks-per-quarter note "Roland DIN Sync". "P_USER 25" is programmed to produce a 24-click stream:

P_USER 25 1 Switch DIN switches DIN Sync on
P_USER 25 0 Switch DIN switches DIN Sync off

These DIN Sync signals will always appear at Output 2. Even here, though, it can be necessary to create a square-wave signal instead of these sawtooth ones *(see next section on "P_USERs 22/ 23")*.

Many DIN Sync devices additionally require a Start/Stop signal: when using the P_USER 25 DIN Sync signal at Output 2, HUMAN TOUCH gives out a Start/Stop signal at Output 3; in Play mode, this Output goes HIGH, in Stop mode LOW.

During DIN Sync, Output 1 remains free for other uses.

14.1.2 Switching/control Outputs, squarewave signal

Each of HUMAN TOUCH's three Outputs can be separately programmed with P_USER 22 and 23 events. To be able to use these properly, a minimum of technical know-how is useful.

A P_USER 22 event will switch an Output to a 5 Volt HIGH. This signal remains high (unlike a "click" signal: see above) until a P_USER 23 event switches it back to a 0 Volt LOW.

P_USER 22/23's "second data bytes" determine the Output. The same P_USER 22/23 signals can be sent to more than one Output by adding together the respective P_USER values *(see section above)*.

Example:

P_USER 22 1 HuTouch HIGH switches Output 1 to HIGH
P_USER 23 1 HuTouch LOW switches Output 1 to LOW

Entering a sequence of these P_USER 22/23 events allows the creation of a switching/controlling signal for any purpose.

To create a 50% duty cycle squarewave signal, the P_USER events must be regular:

1 1 1 1 P_USER 22 1 HuTouch HIGH
1 1 1 5 P_USER 23 1 HuTouch LOW
1 1 1 9 P_USER 22 1 HuTouch HIGH
1 1 1 13 P_USER 23 1 HuTouch LOW
1 1 1 17 P_USER 22 1 HuTouch HIGH
1 1 1 21 P_USER 23 1 HuTouch LOW ... etc

This creates a 24 clicks-per-quarter note signal (one squarewave every 8 1/768th notes). If DIN Sync is also switched on, there is a Start/Stop signal at Output 3 if required.

14.2 Click and audio Inputs

HUMAN TOUCH has three Inputs intended for click and other audio signals, such as a kickdrum microphone.

The lefthand Input switch on top of HUMAN TOUCH switches between the Inputs and the built-in microphone. Microphones and other low-signal sources go into the sensitive Input ("MIC"). Very high-level signals such as from a tape machine go into the second Input ("LINE"). "AUX" is reserved for future projects.

The righthand switch acts as a high/low pass filter and selects between frequency bands. If the acoustic source is, say, a hihat, you can filter out the unwanted lower frequencies which might cause false triggers by switching to "high". The switch is usually left in its "flat" (linear) position.

The rotary sensitivity control regulates the sensitivity of the built-in microphone, the mic and the line Inputs.

The primary uses for HUMAN TOUCH's Inputs are in the fields of post-production (post-synchronization to music on tape) and in the control of tempo in live performances (eg by a drummer).

In the "Tempo Interpreter" window, there are two boxes that deal specifically with HUMAN TOUCH signals:

MULTIPORT: allows/disallows HUMAN TOUCH acoustic signals to be accepted as tempo triggers.

MP-DISCRIMINATION: has a "masking" action: it shows the number of milliseconds that have to pass after an acoustic signal before the "Tempo Interpreter" will accept a new one, ie signals that follow on too quickly will be ignored.

This parameter is very important if you are trying to extract tempo information from acoustic signals (as opposed to pure click signals - see below). Sounds consist of many consecutive vibrations: the necessary information for the "Tempo Interpreter" lies in the attack portion of a sound, but not in each "vibration peak" within the ensuing sound envelope. The Multiport Discrimination function ignores this additional series of vibrations, accepting only the first such vibration of a series. A new sound will be accepted as tempo trigger only after a "pause" (of, say, 60ms) following the previous sound. Even percussive sounds perceived by us as being "short" are actually long enough to need the discrimination treatment.

The "DISCRIMINATION" setting should therefore be set long enough to avoid "multiple triggering", eg 40 to 100ms.

With pure click signals at the Input, this discrimination must be shorter than the distance between the clicks, eg 0 to 15ms.

If signals are accepted by the "DISCRIMINATION" function, they are passed on to the "Tempo Interpreter" for further processing *(see Chapter 26: "SYNCHRONIZATION", section 6).*

14.3 Creating MIDI notes via HUMAN TOUCH

Trigger signals at any of HUMAN TOUCH's Inputs can be converted into a MIDI note in realtime. In the "Tempo Interpreter", set the MIDI Channel, pitch and velocity and switch "HUMAN TOUCH TO NOTE" on.

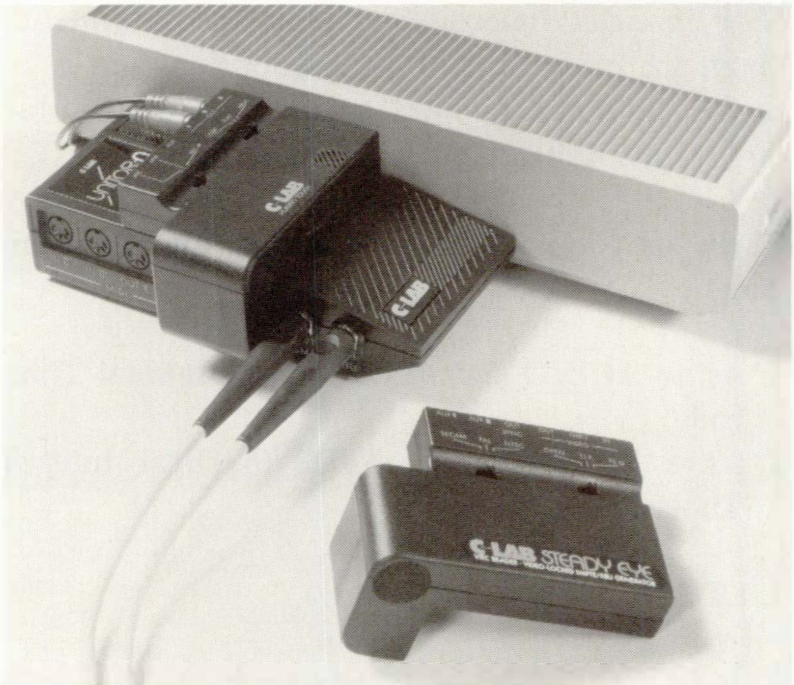
HUMAN TOUCH TO NOTE						-
CHA	1	PITCH	C3	VEL	64	

This allows the created notes to be manipulated in the program as if they had come in via one of the normal MIDI Inputs.

"DISCRIMINATION" is still operative in this mode.

Uses: replacing an existing kickdrum on tape with a sampled one; or creating a "Groove Design" template track from an acoustic signal (eg kickdrum track) etc.

15. STEADY EYE



15.1 Overview

STEADY EYE fulfills two video synchronization-related tasks, together with UNITOR and NOTATOR.

1. It reads "VITC" from a video signal and locks the C-LAB system to the video;
2. It produces a frame-locked ("phase locked") "LTC" audio signal as a result of reading a video signal.

Each of these two distinct operations enables frame-synchronous working to take place where video is the tape medium. It is vital to understand what is meant by "synchronization", "SMPTE/EBU", "LTC", "VITC", and "frame-(or "phase-") locked" *(see also sections 1 to 6 in this chapter)*.

15.2 What are LTC and VITC?

SMPTE/EBU timecode contains the information about the exact time of a tape position, and is expressed in hours, minutes, seconds, frames and bits *(see section 4: "What are SMPTE, EBU...").*

There are two ways to produce SMPTE/EBU timecode:

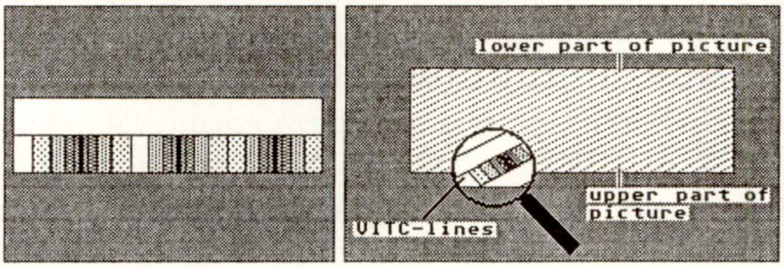
1. **As an AUDIO signal: LTC (Longitudinal Timecode)**
2. **As a VIDEO signal: VITC (Vertical Interval Timecode)**

1. LTC:

SMPTE/EBU LTC is widely-used: the timecode appears as an audio signal which is recorded onto a multitrack tape or onto a video's audio track (normal or "HiFi"). Virtually all SMPTE/EBU synchronization devices work this way, UNITOR included. Because of this, the additional description "LTC" tends to be left out.

2. VITC

SMPTE/EBU VITC has traditionally only been used in the world of professional video production: the timecode forms an invisible part of the video picture, and is therefore an integral component of the video signal.



SMPTE/EBU-LTC on an audio multitrack

VITC on video tape

Do not confuse VITC with a "burnt-in" time that you can sometimes see in a corner of the picture. VITC is digital data that is inserted in the picture's invisible lines (numbers 10 to 22). ("Video text" is also inserted here, something you may have already come across in your television.) There is no visible way of knowing whether a tape has been VITC-encoded.

("Burnt-in" time is a visible SMPTE/EBU clock display that matches the actual timecode, and is inserted into the picture, usually in one corner or along the bottom edge, so the composer etc can see where he/she is in relation to the timecode. It is inserted there by the tape transfer studio at the same time the LTC timecode is recorded onto the audio tracks, or the VITC is encoded into the picture.)

You are not able to generate VITC yourself, and so cannot record it onto your video: this must be done by a tape-transfer studio, dubbing suite or similar.

Synchronization with VITC, as opposed to LTC, has certain unique properties:

- A video frame has exactly the same position on the tape as a frame of VITC.
- Video frames and VITC frames are therefore inseparably locked together (also called "phase-locked"), and remain so however slowly the tape is played. (For the separate matter of generating phase-locked LTC, see below.)
- If ever the tape is recorded over again with material containing VITC, the VITC is (of course) included since it cannot be separated, so no risk of going out of sync.
- The video's audio tracks remain free and can be used for other purposes.
- VITC can basically be read whenever a frame is visible, which even includes freeze-frame and slow motion search modes (forwards or backwards) if your video tape recorder (or "VTR" as we shall call it) is of good quality and allows these modes.

Regarding the precision of the playback (wow/ flutter etc), the use of VITC offers no advantage over that of LTC. The precision depends on the quality of the VTR and of the signal. Whatever the situation, UNITOR, STEADY EYE and CREATOR/ NOTATOR will attempt to get the best out of your VITC or LTC.

15.3 Basic points on video synchronization; which sync method?

For reasons of quality when putting sound to picture (video, or film which has been transferred to video), the soundtrack is normally recorded on its own audio tape, separate from the video, and is later dubbed onto the video where applicable. When using a sequencer to do the soundtrack, there are certain conditions that must be met:

1. The synchronization must be reproducable and precise. This condition is already met by the use of CREATOR or NOTATOR with UNITOR.
2. The timecode must be phase-locked, ie locked to the picture whatever the tape speed.
3. If the timecode is burnt-into the picture so the user can read it, this must agree with the actual timecode.
4. Synchronization should be possible in freeze-frame and search modes.

With the STEADY EYE video synchronizer (together with UNITOR and CREATOR or NOTATOR), all or some of these conditions can be met by using one of two methods:

15.3.1 The generating of SMPTE/EBU LTC which is phase-locked to the video frames, and recording this LTC onto the video's audio tracks.

This method HAS NOTHING TO DO WITH VITC!

This sync method differs from the normal UNITOR synchronization *(see section 6: "Basics of SMPTE-Sync, "Sync-Reference", SMPTE-Offset" and the following sections)* in that LTC (UNITOR's SMPTE OUT) is generated as a result of STEADY EYE reading the video signal itself: this makes it frame-locked. This is a once-only operation using STEADY EYE at the time of generating the LTC; the subsequent reading of this frame-locked LTC is done by UNITOR without STEADY EYE. Any delay between any (visible) burnt-in time and the LTC you have just recorded is constant, and can be compensated for by use of the "Display Offset" function in the "Sync Reference" window. This method meets the above conditions 1 to 3.

STEADY EYE's ability to read the video signal itself is quite separate from its ability to read VITC, and you should not confuse the two. Any video can be "read" by STEADY EYE: it detects the frame edges which act as a simple clock, as a result of which it can make UNITOR generate LTC that is locked to the frame edges.

This method is the one to use if you cannot obtain VITC for your video tape, or if your VTR cannot cope with VITC. However, your VTR must have the ability to dub audio (ie the LTC) onto its audio tracks without this affecting the picture. Some VTR's cannot do this.

If this is the method for you, you need only read the introductory sections, and the section called "Generating a phase-locked SMPTE/EBU LTC".

15.3.2 The insertion of SMPTE/EBU VITC into the video picture by a dubbing suite, etc.

VITC sync via STEADY EYE (with UNITOR) guarantees that picture and timecode are locked. This method meets all four above conditions. If the video is played slowly via slow search or frame advance modes, CREATOR or NOTATOR will react accordingly with the appropriate slow tempo.

This method, unlike the one described above, requires STEADY EYE the whole time since it has to continuously read VITC.

This method requires you to read the whole of this manual about VITC, missing out "Generating a phase-locked SMPTE/EBU LTC".

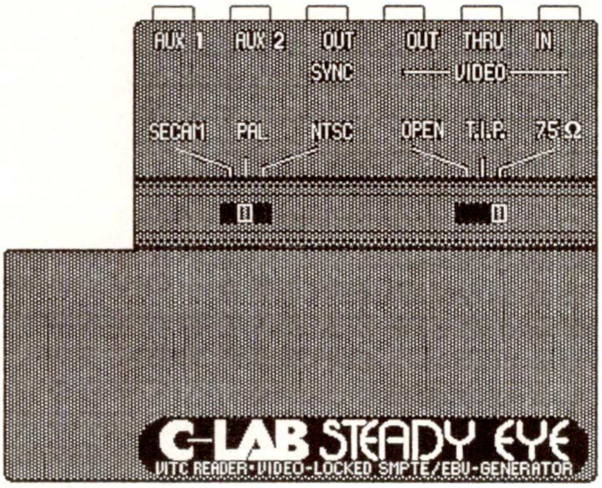
15.4 Connecting STEADY EYE, the VTR with monitor, starting the program

STEADY EYE is connected to UNITOR's Multi-port.

Caution! The computer must first be switched off!

Other peripheral hardware such as the VTR and monitor or television may be connected only after UNITOR has been connected to the computer, and STEADY EYE has been connected to UNITOR. Please never connect or disconnect STEADY EYE while the computer is switched on.

STEADY EYE's ports:



VIDEO IN:	Video input, impedance switchable between 75 Ohm and open, video signal 1 Vpp (Volt Peak-to-Peak)
VIDEO THRU:	connect a video monitor here.
VIDEO OUT:	(Reserved for future use)
SYNC OUT:	Video V-Sync signal for externally sync'able VTRs
AUX 1/2:	(Reserved for future use)

Connect the VTR's video out port to STEADY EYE's VIDEO IN, using a standard video cable. If your VTR requires special cables, these are obtainable from your video hardware dealer.

Connect the video monitor to the VIDEO THRU port. The end of a video connection must be of the correct impedance. If no device is connected to VIDEO THRU, STEADY EYE becomes the end connection, and so the input impedance must be set to "75 Ohm". If a device such as a monitor is connected to the VIDEO THRU port, set the impedance to "OPEN". The third setting, T.I.P, stands for "Try If Problems"...

After connecting the hardware, switch the computer on and start CREATOR or NOTATOR. As a short test after loading, switch the CREATOR/NOTATOR "Sync Mode" to "VITC SCAN" or "VITC LOCK". The first time you switch to one of these two Sync modes, CREATOR/NOTATOR checks the STEADY EYE interface. If there is a problem of non-recognition, the Alert Box "STEADY EYE needed for VITC sync" appears: switch off, count to twenty, then start again. Use the official power switch, not the "warm re-start" button.

15.5 Generating a phase-locked timecode (SMPTE/EBU LTC)

There are two ways for STEADY EYE to generate LTC that is locked to picture, frame-by-frame *(read also section 15.3.1):*

1. You can synchronize UNITOR's LTC generator to an incoming video signal:

- Connect the VTR's output to STEADY EYE's VIDEO IN.
- Connect UNITOR's SMPTE Ouput to the VTR's audio input.
- In the "Sync Reference" window, set the generator mode to "Video frame locked" with the desired start time and the correct frame rate (the frame rate must match the video's one).
- Start the LTC generator and record the LTC onto the video's audio tracks, taking care not to wipe the picture. Your VTR must be able to record audio separate from the picture. 2. If you own a VTR that can be externally-synchronized, it can be sync'ed to the LTC generator:
- Connect STEADY EYE's SYNC OUT to the VTR's sync input. Switch the VTR to its external sync mode. (STEADY EYE transmits a V-Sync signal at its SYNC OUT port while generating takes place.)

- Connect UNITOR's SMPTE Ouput to the VTR's audio input.
- In the "Sync Reference" window, set the generator mode to "Quartz clocked" with the desired start time and the correct frame rate (the frame rate must match the video's one).
- Start the LTC generator and record the LTC onto the video's audio tracks, taking care not to wipe the picture. Your VTR must be able to record audio separate from the picture. In all other details, proceed as directed in *section 7: "Generating SMPTE/EBU timecode"*.

15.6 Inserting VITC - what is involved? Which VTRs to use

There are several factors that affect the quality of VITC sync:

- the picture quality of the cassette
- the VTR
- the VTR's settings and "VITC line"
- type of VITC encoding

The need to use video cassettes of the highest quality is self-explanatory. Do not use those of dubious quality or age.

So-called "professional" VTRs are the best to use, but also the most expensive. VITC tends to be used with this type of machine only.

The professional's choice is a "U-Matic" VTR. However, the best VHS and Betamax machines can give equally good results for reading VITC. The factors which most influence success in reading VITC are the quality of the VTR, combined with having a tape that has VITC encoded on as many lines as possible (see below).

However, STEADY EYE was developed with users' domestic VTRs in mind. Because of the way they are built, these machines deliver unstable video signals, a problem which is hardly noticeable in the picture, but which makes VITC sync difficult.

VTR Criteria:

- Very good quality of freeze frame picture
- Very good quality of slow-motion search mode picture
- As little vertical movement as possible during freeze frame and search modes (both directions) compared with playback at normal speed
- Adjustable tracking, separate for normal play and freeze frame. If your VTR has an "auto" or "digital" tracking setting, disable this, because we need to achieve the best possible quality in the upper part of the screen.
- Any electronic dropout-compensation function should be switched off (often called "EDIT", "PCM", etc)
- Adjustable picture sharpness. If there is no such function, an average sharpness is preset. This artificial sharpness is achieved by the conditioning of image details within the VTR's resolution. If you have the option of improving the resolution by using a "sharpness" function, this probably introduces a distorted signal that will impair VITC readability. The amount of sharpness should therefore be set low.

- For the sake of your comfort, transport controls and positioning should be simple and efficient. The ideal is that a VTR should have a "jog/ shuttle" wheel to access the desired frame, or at least the equivalent buttons to allow slow motion play forwards/backwards. If you wish to use a remote control device, ensure the frame positioning controls are on it, and that it is quick and reliable.

The use of low-price VTRs cannot be recommended: they are too unreliable for VITC playback. They may well be okay for normal-speed playback, but not for freeze frame or slow motion replay.

Even "better" domestic VTRs do not always deliver a reliable VITC signal: freeze frame/slow motion accuracy tends to be the biggest problem, due the slipping of the whole picture up or down ("vertical hold"). This affects the exact position of the VITC line(s). STEADY EYE is limited as to how much it can compensate for these deviations.

One solution to these problems is to encode VITC on more than the two lines normally used: you could have the tape's lines 10 to 22 encoded with the identical VITC signal, giving STEADY EYE a better chance of reading the signal even if the picture slips.

You cannot encode the video with VITC yourself: this can only be done in a video dubbing suite or similar. Unfortunately, not all such establishments can carry out this encoding on several lines, but are restricted to the two lines that represent the SMPTE/EBU standard.

With two lines encoded, you are limited as to what you can do if your VTR is of domestic quality:

- the search modes may be unreliable; this depends very much on the VTR's quality
- in freeze frame mode, some VTRs have very poor frame stability. If no valid VITC data is received, CREATOR/NOTATOR will stop. Again, the VTR's quality is the deciding factor.

So try to obtain multi-line VITC encoding if your VTR cannot handle the above criteria satisfactorily.

Tip: sync accuracy during normal playback is not impaired by unreadable VITC, even with the cheap VTRs, as CREATOR/NOTATOR can also lock to the frame-edge information of the video signal itself.

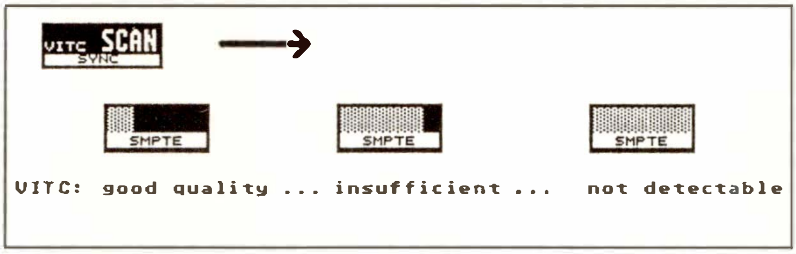
15.7 Setting up the VTR, VITC line and VITC timeout

IMPORTANT! Please follow these settings carefully as they influence the success of STEADY EYE's operation.

Set the "SECAM/PAL/NTSC" switch to the correct position, the impedance switch to "OPEN" if you have connected a monitor (otherwise to "75 Ohm"). *(Video connections must end with the correct impedance: one device must therefore be connected at the end, whose impedance is 75 Ohms.)*

Please ensure the "Sync Reference" window's frame rate is correct. European "PAL" needs a rate of 25 fps.

Set the "Sync Mode" to "VITC SCAN" and observe the SMPTE position display and SMPTE quality display (the "SMPTE" box below the pattern window) as you try each operation of your VTR. No blips across the display is the ideal. Any blip less than halfway still signifies a relatively good VITC signal; a blip more than halfway across the display indicates a poor VITC reading. If the display shows a full-width reading (grey beam completely visible), this means "not receiving any VITC at all".



VTRs have electronic switching that suppresses or evens out interference in the picture. This switching can impair the VITC signal. Some VTRs allow the user to disable this feature, and you should do so if possible.

Tracking for normal playback mode and, where available, freeze frame/slow motion modes should be adjusted so as to show minimum disturbance of the picture. If the VTR allows the regulation of flimmer or vibration in freeze frame mode (usually a little control at the back or underneath), adjust it carefully. At all times pay attention to the upper part of the picture, for that is where the VITC signal is inserted. Any automatic tracking function should be switched off if possible.

In the "Sync Reference" window, the default VITC timeout of 100 should be enough (these are half-frames, ie approximately 2 seconds). Timeout defines how long CREATOR or NOTATOR will wait following the non-recognition of VITC during VITC sync, before switching to Stop mode. If there is no video signal, NOTATOR stops immediately.

The VITC line setting is best tried while the VTR is in operation, with CREATOR or NOTATOR in "VITC SCAN" Sync mode. Find out the VITC line value that gives a continuous timecode readout, at the same time giving the fewest blips in the SMPTE quality display.

Where you are using VITC on several lines, many of them should show the same good quality read-out, without any difference in quality. The SMPTE quality display should show few blips. Optimize the VTR's settings (tracking, picture sharpness etc) as described above, then check which is the best line to read, especially in freeze frame and slow motion modes.

Tip: tracking cannot normally be adjusted in freeze frame mode, so choose the slowest possible tape speed instead.

With the standard two lines encoded, SMPTE quality will not be changed by trying any of the VITC LINE values, other than within a relatively narrow, sharply-delineated area of the VITC lines (eg 16/18 or 17/19).

Once you have found the best line for all operations, optimize the VTR's settings to get the best SMPTE quality display.

The success or otherwise of these efforts depends very much on the quality of the VTR. You may have to compromise to find the VITC LINE setting that displays the best all-round sync results. Freeze frame and slow motion playback sync is not always possible with two-line encoded tape.

15.8 Synchronizing with VITC

The sync'ing of CREATOR or NOTATOR to VITC is similar to the sync'ing to LTC. Read again *sections 7 to 11.* The principles of the "Sync Reference" remain the same, so become familiar with this before embarking on VITC work.

Starting the VTR at the normal speed will cause the SMPTE position display to run. If this position is within the Sync Reference, CREATOR/NOTATOR will start.

You can select between "VITC SCAN" and "VITC LOCK" Sync modes:

VITC SCAN mode: assuming that your VTR and the VITC signal satisfy the quality requirements (see above), the speed and direction of the tape may be changed at will: NOTATOR follows the tape's position, with a slight delay at each change of tape speed/direction. VITC SCAN is intended for editing and note entering, especially with the "PICKUP FRAME" function ('/' key in the event editor) and the "MIDI Pickup Frame Input" function (MIDI Step Input within VITC sync, see below).

VITC LOCK mode: CREATOR or NOTATOR will only work when the tape speed is normal. This allows it to lock more closely to the VITC (as it is also reading the video frame edge pulses) and should therefore be used when the greatest accuracy is demanded. This is the mode to use when recording the final version to audio tape after all the editing has been done. In VITC LOCK mode, there is a longer delay before CREATOR or NOTATOR start.

If the sequencer stops without warning during VITC sync, it must be because STEADY EYE was not able to read the timecode at some point. Check all the settings (see above). Only then should you try increasing the VITC TIMEOUT value in the "Sync Reference" window: this makes the program wait longer before tripping out after bad or missing code. The slight disadvantage is that the program then takes a little longer to stop after an intended tape stop.

If the synchronization does not stop, but the sequencer runs erratically at the tape's normal speed, please check the "FRAME/sec" rate in the "Sync Reference" window. PAL tape requires 25 fps.

In some ST computers, especially the Mega ST's, the "blitter" chips can prove problematical for synchronization. Try switching out the blitter on the ST desktop before starting the program; failing that, the blitter chip may have to be removed altogether.

Tip: if you stopped the sequencer during synchronization, simply press the 'Y' key twice to restart it in sync with the running tape.

15.9 Helpful synchronization features

15.9.1 Display Offset

The DISPLAY OFFSET parameter in the "Sync Reference" window can be given a value which will be subtracted from all SMPTE displays, except the main SMPTE display next to the Main Bar Counter. For example, if the SMPTE OFFSET value is also entered in the DISPLAY OFFSET readout, events will be shown as starting at "00:00:00:00" ("Position in Frames" switched on).

Likewise, this parameter can enable the program to show the same time as is displayed in any burnt-in time display on the screen. With VITC synchronization, this is not normally necessary as the two ought to agree.

15.9.2 Pickup Frame

The "Pickup Clock" function in the event editor ('/' key) allows an event to be given the current time position.

When valid timecode is received (eg VITC), the SMPTE frame position serves as the basis for giving the event a time value. The program rounds the current position to the nearest frame, calculates the bar position (in 768ths or 1536ths) and inserts the event at that position.

15.9.3 MIDI Frame Input

If MIDI Step Input is enabled, and when valid time-code is received (eg VITC), notes entered will be given the exact current time position in frames: to do this, the program rounds the current position to the nearest frame, calculates the bar position (in 768ths or 1536ths) and inserts the event at that position.

Example: in VITC SCAN mode, with MIDI Step Input on, move the tape to a selected frame. Play a key on the MIDI keyboard that triggers the sound that belongs to that frame. The note is automatically inserted at the current frame position, without your having to do any manual positioning.

16. EXPORT

EXPORT is a "MIDI Expansion Interface" with three additional MIDI Outputs ("B", "C" and "D").

Together with port "A" (Atari MIDI Output) there are therefore four separate available MIDI Outputs; if UNITOR is added to the system, then six Outputs are separately addressable.

Each individual port has 16 MIDI Channels. Each port is identified in by a capital letter: port A is the existing, built-in port in the Atari; ports B, C and D are in EXPORT, UNITOR has ports E and F.

Each sequencer track can be assigned to one of the six ports. The "CHANNEL" track parameter determines the port (A-F) and its Channel (1-16).

Any combination of port/MIDI Channel is possible (up to 96), and all 96 combinations can be given a "Channel name".

In larger MIDI systems where lots of data is used, EXPORT will further improve timing of events due to its ability to send data in parallel: there are more "openings to the outside" for MIDI data to pass through; this becomes all the more evident the bigger the MIDI system and amount of MIDI data in use.

Several MIDI devices in a system should be connected to the various ports, and one way would be connect your drum machine/sampler containing percussion and drum sounds to port A and your bass device to port B.

If UNITOR and EXPORT are used together, "critical" instruments such as those producing drum sounds or large amounts of data should use ports A, B, E and F. In this case, ports C and D in EXPORT should receive only single instruments.

If EXPORT is used without UNITOR, timing-critical instruments should be connected to A and B.

System Exclusive messages may be sent through any of the ports, but do bear in mind that when transferring whole sound banks of data, the ports cannot be completely independent one from the other - they have to wait for each other to catch up during these very long messages. You cannot expect port A to keep perfect time if port B is transmitting a whole, say, DX7 soundbank, though the most independent ports are A, B, E and F. Perfect time should, however, be possible when dealing with single patch data.

See also Chapter 6: "TRACKS", section 3.1.3 "MIDI Out ports".

28. Disk Operations

28. Disk Operations

28. Disk Operations

While you are working with CREATOR or NOTATOR, all recorded data is temporarily held in the computer's Random Access Memory, or "RAM". If the computer's power supply is switched off or interrupted even for a split second, the contents of the RAM will be lost forever. You should therefore regularly save the RAM contents to disk for more "permanent" storage.

1. Data organization on disk, "files"

The program's disk operations are in the "File" menu. These concern the saving and loading of your work in the form of "files" in a format recognizable to CREATOR and NOTATOR. A disk must be "formatted" *(see section 8)* before it can accept files.

A file is given an 8-character name by you before saving, which allows it to be recognized again.

All files have an three-letter "extension" after the name which identifies them to you and the computer as being of a particular type. File extensions are always shown with a "." before them, and we use the convention of placing a "*" before the "." to mean "any filename with that extension". The most common are:

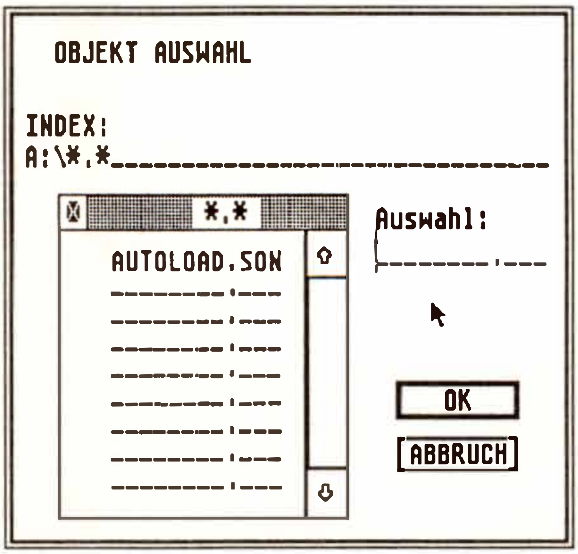
*.SON: a global file containing all SONG data
*.BON: a "backup song"
.PAT: a whole pattern (.BAT: "backup pattern")
.SEQ: a single track (.BEQ: "backup track") ("SEQ" = "sequence")
.MID: a Standard MIDI File (.BID: "backup MIDI File").

Other file extensions include *.REF/*.BEF for the "Sync Reference" *(see Chapter 27: "UNITOR ...", section 11)* and *.PRT/*.BRT for a printer adaptation *(see Chapter 14: "SCORE PRINTOUT", section 7).*

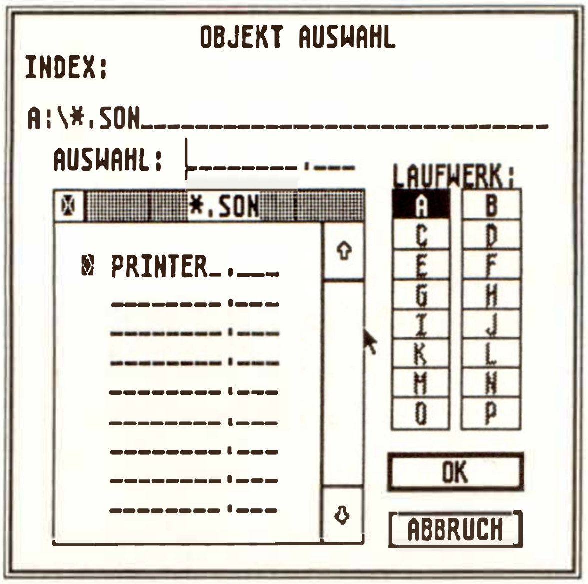
Never remove a disk from the drive while the "drive light" is illuminated - to do so would be to risk losing information on the disk, or risk damaging the drive mechanism.

1.1 The Atari File/ Item Selector

During all disk operations a dialog box appears, called an "Item Selector" or "File Selector" depending on your computer version.



The Atari File/Item Selector, which is pretty basic, can be replaced by "Accessory" programs which allow far more operations to be conducted from the Selector, though the later Atari TOS 1.4 Selector at least allows the disk drive to be selected easily.



The Selector is part of the Atari's operating system and is therefore identical whatever type of file you are saving/loading. In the left half of the Selector is the file list, which shows files that are on the disk in the current drive. The list always defaults to showing only files of the relevant extension: if you click "Save SONG", the Selector will show *.SON files only, even though the disk may contain many other types of files, including *.BON files. Folders on the disk are also shown - see below.

Additionally, the program names the operation you are doing at the top of the screen: always ensure this is correct before going ahead.

The list can be scrolled to show more names if necessary: click the "down-arrow" in the bottom right corner.

When loading, a file is selected by finding it, then double-clicking it in the list; or clicking it once so that it appears in the "Selection" line, then clicking "OK".

When saving, type the filename in the Selection line then click OK. So long as the list is showing the correct extension in the grey bar above, the extension does not have to be typed again (though you may like to do so to play safe). All characters are in capital letters (no need to press 'Shift'). Spaces are not allowed, but you may use 'Shift hyphen' and 'Shift colon'. If the name is shorter than 8 characters, type the '.' after the last character and the cursor jumps to the extension part.

If your song, pattern etc already has a name, this name will automatically appear in the Selection line.

→ ◆ FOLDER_N.AME

If the disk contains "folders" (which contain more files), these will also be shown in the list, whatever the file extension. A folder has a special "diamond" symbol before and to the left of its name. Click the folder to see what files and other folders are inside it.

The "Directory" or "Path" line above the list is very important. It always shows the "path" which you have followed to get to that position on the disk which the list is showing. The Directory line is not as confusing as it looks:

- The first letter character shows the current drive. The drive letter is always followed by a ":" which means "drive". So, "A:" is the in-built drive A.
- The next character is the backslash "\" which means "what follows is in the "root directory" (ie what is immediately visible and not in a folder)". If there is another "\" after a name, <u>whatever is between the backslashes is in a folder.</u>

- After the "\" comes either the folder name if open, or the "*", which means "I am displaying files of any name".
- Lastly, the extension is shown as a "." followed by 3 characters. Instead of the 3 characters, there may be a "*", meaning "I am displaying files of any extension".

The Directory line can be directly edited: click it so the Selector cursor moves up, then use 'Esc' to delete the whole line, 'Backspace' or 'Delete' and the cursor arrows. With the above knowledge, you can request your own "path". If you type:

A:*.*

you are saying: "show what is on the drive A disk, whatever the filename, whatever the extension (ie show everything). If you type:

C:\PRINTER*.PRT

you are saying: "show what is in the hard disk partition C, in the PRINTER folder, whatever the filename, but only files with the extension ".PRT"".

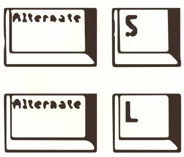
To carry out the command, click in the grey bar above the list. To close folders, click the list's "close box" in its top lefthand corner.

Directory requests may be carried out whatever "File" menu function you clicked: if you clicked "Load SONG", but wish to see all the files on the disk, use 'Backspace' to delete the .SON extension and replace it with .*, followed by clicking the grey bar (this is how to find and load a *.BON file, for instance).

More recent Atari ST Selectors have additional drive boxes which you click to select a drive, and sophisticated Selector accessory programs have pre-programmed extension boxes, too.

For more information see your Atari ST operating manual.

2. "Save/Load SONG"



To save a song to disk, click "Save SONG" ("File" menu) or press 'Alternate-S'. To load a song from disk, click "Load SONG" or press 'Alternate-L'.

These two functions are the two most important "File" ones, as they save/load the entire contents of the program.

Always save your work using "Save SONG", even if you have only used one pattern: as well as all the music, this saves the tempo, time signature, MIDI Thru options, "Transform" sets, "Sync Reference", Hyper Edit sets etc etc.

Save your work regularly to disk, especially after recording or editing music that you would hate to lose if there was a power failure.

A loaded song will replace (delete) the current one in the RAM (or its current version), so ensure this is what you wanted to do before clicking "OK".

If you save a song, and the song's name is already displayed in the "Selection" line (because you previously loaded or saved the song), click "OK". If a file with the same name and extension is already on the disk, the program will tell you that a file by that name exists, and will ask you whether you want to rename that file on disk so that it has a .BON extension or whether you want to delete the file on disk.

Always respond by clicking "RENAME": this keeps the file already on disk (but gives it a .BON extension), and saves the current one with the .SON extension. That way, there is always a safety backup on the disk, allowing you to go back one version if you made a mistake.

(You could give a new name to the same song each time you save it, thereby keeping each version (eg "MYWAY1.SON", "MYWAY2.SON", MYWAY3. SON etc) but you would soon run out of space on the disk.)

If the computer alerts you to the fact that there is no space left on the disk, you should either save onto a fresh formatted disk, or delete a file *(see section 7 "Delete File")*.

2.1 Backup disk copies

There is no guarantee that your disks will not corrupt and lose data while in storage.

Golden rule: if you work with computers, always make copies of your important disks and store them separately.

A few seconds spent making a backup copies of your files on separate disks at the end of the working day is time well spent.

There are many reasons why a file can sometimes not be read by a program, but following the advice in this manual should minimize the risk of avoidable file corruption.

Rarely, if a file cannot be accessed, it may be that the disk drive which saved it was out of alignment. It reads its own disks, but not those of other computers; and other computers cannot read its disks.

Do not be tempted to use "unbranded" disks because they are cheaper. This is a false economy as they tend to be less well examined by the manufacturer than well-known brands.

2.2 Handling disks

Disks are sensistive to magnetic, mechanical and thermal influences: loudspeakers, power supplies, dust, babies, Coca Cola etc. Carry them in special disk boxes or wallets and do not leave them lying around in the sunlight or on top of the computer.

2.3 "Autoload Song"

There is a method of defaulting the program with a user's favourite parameters and functions when it loads.

If a file called "AUTOLOAD.SON" is present on the program disk it will be auto-loaded whenever CREATOR or NOTATOR are started.

Hard disk users: AUTOLOAD.SON must be in the same partition/folder as the program.

To create an AUTOLOAD.SON: load the program, set your defaults *(see throughout manual for details)* such as Channel names, Fonts, MIDI Click etc, ensure the program disk is in the drive, select "Save SONG", type AUTOLOAD.SON in the "Selection" line and click "OK".

NOTATOR and CREATOR may come with an AUTOLOAD.SON already on the disk: this can be edited to your configuration and saved again. Do not use any other name than "AUTOLOAD.SON".

2.4 Multitasking disk operations

You may save and load a song to/from disk while another one is still playing; useful in live situations.

When loading while another song is playing, a dialog box appears saying "PRESS OK FOR SONG EXCHANGE". When you are ready to exchange them, click "OK" or press 'Return': it takes a couple of seconds to swap songs. The current song is deleted, and the new one installed in the RAM. Song swapping only works if there is enough RAM to hold two songs.

To save a song while the sequencer is in "Playback" mode: same instructions as for saving a song when stopped *(see section 2 above).*

Disk formatting is also possible during "Playback" mode.

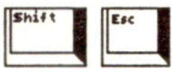
The screen display freezes during these operations: this has no effect on the song being played, which carries on as normal, though you lose the MIDI Thru function and access to the controls.

2.5 Pre-programmed "Load SONG"

Inserting and naming a "P_USER 20" event in the event list will automatically load another song into the buffer while the current one is playing; useful in live situations.

The song is not actually loaded into the current RAM, but waits in the buffer for a song exchange.

- Drag a P_USER event into the event list from the "PSEUDO" box on the left. Place it at the desired time position.
- Alter its "first data byte" to 20, its "second data byte" to 0.
- Press 'Shift-Esc' to open a naming line: type in the song's filename (lower case letters, no spaces, no extension), click "OK".



The name will not be seen unless the "#" icon is enabled. To edit a name, press 'Esc' when the event list cursor is on the event.

When the song reaches the P_USER 20's position, the program will look for the named song in the disk drive (floppy or hard) and folder last accessed and load it. If a "file not found" message appears, the program is probably looking in the wrong folder: check where the song is under "Load Song" and see that the correct folder is open. The program will not load songs if you are in the event editor.

A second P_USER 20 later in the event list, whose "second data byte" is 1, will automatically exchange the two songs and start the new one from the beginning.

Or, if the second P_USER's "second data byte" is 0 again (no need to name it), the songs will be exchanged but the program will wait for a manual start command.

Or, if there is no second P_USER 20 event, the songs can be manually exchanged with a right mouse button click (mouse pointer is not visible) or pressing any key but 'Return' or 'Enter': the current song stops and is replaced with the new one. A left click or pressing 'Return' or 'Enter' cancels the operation: the current song continues playing and the new song is deleted from the buffer.

3. "Load System"

"Load System" ("File" menu) allows the importing of various settings and parameters from *.SON files on disk into the current song without affecting its arrange list, patterns, tracks, events.

The window allows the selection of one or more options. Click "LOAD", and the usual File Selector appears. In the list, double-click the *.SON file whose parameters you wish to import.

Channel Names: *see Chapter 6: "TRACKS", section 3.1.1.*

RMG MIDI Definitions: the user-definable faders, switches etc: *see Chapter 22: "REALTIME MIDI GENERATOR", section 11.*

RMG Snapshots: *see Chapter 22: "RMG", sections 7/8/9.*

Transform Parameter Sets: *see Chapter 24: "TRANSFORM", section 2.2.*

Universal Maps: *see Chapter 24: "TRANSFORM", section 6.*

Drum Map: *see Chapter 11: "SCORE DISPLAY", section 26.*

Notepad: *see Chapter 21: "OVERALL SETTINGS", section 8.*

Hyper Edit: the parameters of 8 Sets each with 16 Instruments: *see Chapter 15: "HYPER EDIT", sections 4 and 6.*

Font Settings: NOTATOR only: *see Chapter 13: "TEXT FUNCTIONS", section 6.*

Adaptive Groove Parameters: the 8 Sets: *see Chapter 17: "QUANTIZE, ...", section 3.*

Key Macros: *see Chapter 3: "GENERAL HANDLING", section 2.1.*

4. "Save/Load Sequence"

To save a track to disk, click the track then click "Save Sequence" ("File" menu). To load a track from disk, click an empty track location then click "Load Sequence".

For details, read section 2 "Save/Load SONG", replacing references to the song with those of a track.

Saving a track has a number of uses, storing SysEx, ideas etc.

5. "Save/Load Pattern"

To save the current pattern to disk, click "Save Pattern" ("File" menu). To load a pattern from disk, click "Load Pattern".

For details, read section 2 "Save/Load SONG", replacing references to the song with those of a pattern.

A pattern can be loaded into any empty pattern window.

Saving a pattern has a number of uses, especially where you wish to import a music section into a different song. If you are not doing this, however:

Always save work as a .SON file.

6. Standard MIDI Files

6.1 Standard MIDI File formats

Standard MIDI Files are a more-or-less-standard data format which are designed to enable data created on different manufacturers' MIDI sequencers to be transferred between programs. CREATOR/NOTATOR support Format 0 and 1.

- Format 0: one track containing an unlimited number of events on all 16 Channels.
- Format 1: for several parallel tracks containing an unlimited number of events on all 16 Channels.

Only information that is in one pattern whether it contains 1 or 16 tracks is saved as Standard MIDI File.

CREATOR/NOTATOR will save and load in the SMF format:

- the full high resolution of 1/768th notes
- all MIDI Channel data (Notes, Pressure, Control...)
- SysEx messages without Handshakes
- Track name (handled as first text event in the track)
- Text events
- Tempo
- Time signature

The following information cannot be recognized by a Standard MIDI File:

- any track parameters (Transpose, Velocity...). Therefore, use "Normalize" and "Process Data" to alter the events *(see Chapter 6: "TRACKS", section 4).*
- Channel and pattern names.
- any P_USER events (except for Tempo and Text)
- NOTATOR's additional graphical symbols (slurs, accents, dynamic symbols...) and page layout. Beware that the user-rests are notes, so delete them before saving as a Standard MIDI File.

Note: the data format of Standard MIDI Files is not fully developed, so there may be incompatibilities.

6.2 "Save/Load MIDI Files"

To save the current pattern to disk in the Standard MIDI File format, click "Save MIDI File" ("File" menu). To load a Standard MIDI File from disk, click "Load MIDI File".

The current pattern is saved as Format 1. If it contains only one track, this track is saved as Format 0 (some sequencers can read only Format 0).

Standard MIDI Files should be used only when transferring files to or from other manufacturers' sequencers.

For details, read section 2 "Save/Load SONG", replacing references to the song with those of a MIDI File.

7. "Delete File"

To delete a file on disk, click "Delete File" ("File" menu).

This deletes only what is already on disk, not what is in the computer's RAM. The File Selector displays every file and backup file. A message will ask you whether you wish to proceed with the deletion: if "OK", the file is gone forever!

8. "Format Disk"

To format a disk, click "Format Disk" ("File" menu).

Before first use, a new disk must be "formatted" by the computer to conform to the Atari way of storing information. This erases any data that might already be on the disk, so double-check that you want to format it.

The dialog box asks whether you wish to format "SINGLE" or "DOUBLE": always click "DOUBLE" as this maximizes use of the disk (both sides).

Do not attempt to format disks that were once formatted and used on other devices (samplers etc). Always keep a good supply of branded, formatted disks available.

29. SOFT LINK Multi Application Manager

29. SOFT LINK
Multi Application
Manager

1. The basics

In furtherance of a "UNIVERSAL SYSTEM", the aim of SOFT LINK is to open the architecture of NOTATOR and CREATOR to other programs, so as to encourage the creation of many different applications integrated with hardware peripherals.

To fulfill the differing requirements of users and produce results as fast as possible, there are three SOFT LINK Levels:

Level 1: the DIRECTOR desk accessory represents the simplest form of SOFT LINK. It works without having NOTATOR or CREATOR in the same computer, with programs in a 1 Megabyte ST computer.

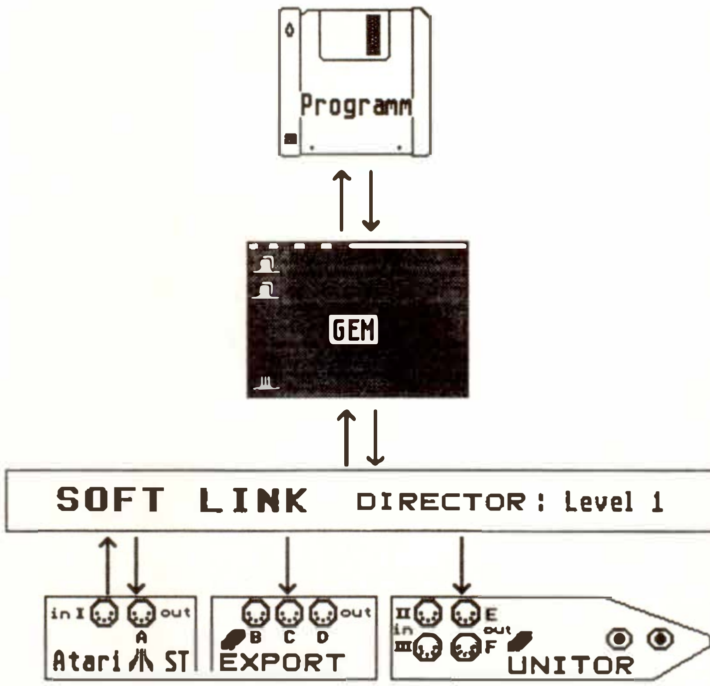
Levels 2 and 3: the SOFT LINK manager is an integral component of CREATOR SL and NOTATOR SL and allows up to nine programs to simultaneously reside in the computer's RAM, so long as there are at least 2 Megabytes of RAM (the ideal being the maximum 4 Megabytes). If you use the Atari SLM804 laser printer then 4 Megabytes become necessary when running SOFT LINK as well.

2. DIRECTOR

2.1 The basics

DIRECTOR, a desk accessory which runs without the need for CREATOR or NOTATOR to be present, is copied onto other programs' disks and redirects the MIDI data of these programs to MIDI Outputs B-F in EXPORT AND UNITOR.

DIRECTOR is available as a separate disk only: it is not provided with CREATOR SL or NOTATOR SL because it is not for use with these programs. If you want to use DIRECTOR with your other programs, please request the disk from your music dealer.



It allows the user to make use of the additional ports of his/her C-LAB hardware when using other programs, avoiding the need to re-patch instruments to the Atari MIDI Output.

DIRECTOR represents the simplest form of SOFT LINK; it uses very little RAM and so can be used with 1 Megabyte Atari's as a MIDI patcher. As such it provides a link between non-C-LAB programs and the MIDI Outputs of C-LAB hardware. Since DIRECTOR simply expands the existing MIDI routines in the Atari operating system, it maximizes the potential of compatibility (providing, of course, that the programs also use the Atari operating system's standard MIDI routine).

See section 5 on "Compatibility".

2.2 DIRECTOR as "Accessory"

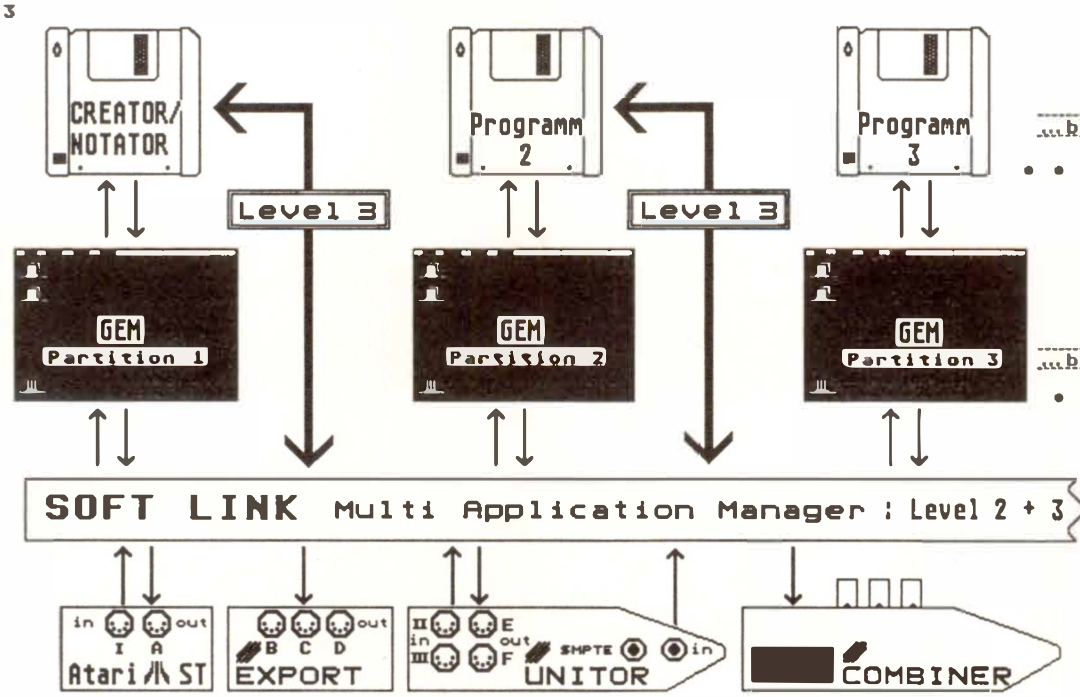
The DIRECTOR is available separately, not with CREATOR/NOTATOR SL, and comes with instructions on loading it onto other programs' disks. Please refer to those instructions.

3. SOFT LINK: the basics

SOFT LINK switches between up to nine simultaneously-residing programs in the computer's RAM.

The programs behave as if they are each running on a separate computer, each with its own (software) MIDI Ins and Outs.

NOTATOR/CREATOR SL act as a central control for MIDI Ins and Outs, merge and transmit all the data, and synchronize to SMPTE. These functions remain active, even when other programs are running ("Multitasking"). MIDI Thru processing and realtime processing (eg realtime "ghost tracks", filtering or "Transform") of all three Inputs make the system universal in its potential.



When SOFT LINK is installed, the computer's memory will be divided up into user-definable RAM partitions. Each partition then becomes a virtual computer, ready to load its own set of instructions.

Not every program is SOFT LINK compatible. To be safe, before loading a new program, save any important data you may have in other partitions.

Please see sections 3.2 "Switching partitions" and 5 "SOFT LINK and compatibility".

If using COMBINER, SOFT LINK auto-switches between the four dongle slots as you switch between the first four partitions. UNITOR remains available at all times.

This way, key-protected programs remain fully integrated; if, say, you select X-ALYZER in partition 2, its dongle in COMBINER port 2 is auto-activated; UNITOR's MIDI Inputs and Outputs and SMPTE synchronization remain fully operational.

3.1 Starting CREATOR/ NOTATOR from SOFT LINK

Double-click "SOFTLINK.PRG" to start CREATOR SL or NOTATOR SL.

After a while you can start work. If instead a "not enough memory" message appears, *see section 4 "LINKEDIT" below.*

SOFT LINK is modular: if you do not want to use the SOFT LINK part, or cannot due to lack of RAM, you can start CREATOR or NOTATOR without SOFT LINK, and no extra memory will be used.

To start CREATOR/NOTATOR without SOFT LINK, double-click their program icons.

3.2 Switching partitions

Press the right 'Shift' key and one of the numbers in the calculator keypad to select the partitions. 'Right Shift-1' selects NOTATOR or CREATOR, higher numbers select other partitions where available.

The partition number can always be seen at the top left of the screen.

The currently-displayed program continues its functions from the point it was left at when it was last accessed. CREATOR or NOTATOR, however, will continue running even if another partition is displayed, together with all its realtime functions such as Record, CYCLE, MIDI Thru, realtime "Transform", realtime "ghost tracks", realtime "Playback" parameters, "SMPTE Sync" mode etc. If these tasks are a heavy load for CREATOR, then the reaction times of the other program will be a little slower.

The user-interface was designed to give the impression that more than one computer was being used, such that it seems that several computers are being run with the same monitor: switching is instantaneous between partitions. Each partition has its own, virgin desktop from which to start the desired program; SOFT LINK allows you to operate the Atari as normal.

The following commands remain active in any partition:

Calculator keypad:

'Right Shift-0' : **Start**

'Right Shift-.' : **Continue**

'Right Shift-Enter' : **Stop**

'Right Shift-*' : **Renew Record** (for safety, you may not start recording when not in CREATOR/NOTATOR SL).

Do not switch partitions while saving to/loading from disk.

Although it can be safe to do so, it is wiser to ensure the safety of your data by remaining in the partition. The Atari does not have a "Disk/File locking system" that you find in a large office multi-user system, and data can go adrift if you switch programs while valuable data is being saved.

Not every program is SOFT LINK compatible. To be safe, before loading a new program in a partition, save any important data you may have in other partitions.

In certain cases, a non-compatible program could cause the system to crash. Pressing the computer's rear panel "reset/warm start" button once activates an "emergency" function which will attempt to rescue the data in the RAM and will switch to another partition: you now have a chance of saving the other partitions' data to disk. Do not switch back to the "bad" partition: once you have saved any data, power down the computer, wait 20 seconds and restart the SOFT LINK system.

3.3 Manipulating MIDI Data transmitted from the partitions

MIDI data from the partitions is internally mixed with the CREATOR/NOTATOR MIDI data. The MIDI Thru function's

"Playback" parameters (ie the track parameters set in an empty track) will operate as if the data were coming from outside the system.

Track parameter "CHANNEL" is particularly important since this is where you select the output ports A-F for the various partitions' MIDI data.

In Record mode, CREATOR/NOTATOR will record and display other partitions' MIDI data. CREATOR/NOTATOR's "SOFT LINK" filter window ("Options" menu) allows you to filter out unwanted data before recording.

This special record filter will affect the recording only. All MIDI data is transmitted anyway, unless the MIDI Thru function's Output Filter ("Output Filter" in the "MIDI" menu) is realtime-filtering data.

The MIDI data present at all three MIDI Inputs (Atari and UNITOR) is available to all partitions in a merged state.

SysEx data arriving at the Inputs will be re-transmitted by the non-CREATOR/NOTATOR partitions to the Outputs only if "SysEx THRU" is enabled in "SOFT LINK" ("Options" menu).

The disabling of this "SysEx THRU" option represents an additional SysEx output filter for the use of non-CREATOR/NOTATOR partitions only, saving you the need to manually switch off the MIDI Thru function. For example, if incoming SysEx data intended for an editor/librarian program was re-transmitted, this would cause problems.

Example: one obvious application for SOFT LINK is combining CREATOR or NOTATOR with one or more MIDI editor/librarians. Switch to a new partition and start the desired program (from now on, accessing this new program is done via a keystroke as discussed above - no need to keep loading the program).

The SysEx sound data of this editor can be recorded by CREATOR/NOTATOR as if it had been "ported across" from a second computer: in CREATOR/NOTATOR, click "RECORD", switch to the desired partition, select and change sounds in the editor, cease recording via 'Right Shift-Enter', switch back to CREATOR, and you will find the editor's data in the CREATOR track, which can be played back. Editors often send additional non-SysEx MIDI messages (Controllers or Pitch Bend) which you can filter out in the SOFT LINK Record Filter ("Options" menu).

4. LINKEDIT: editing the SOFT LINK configuration

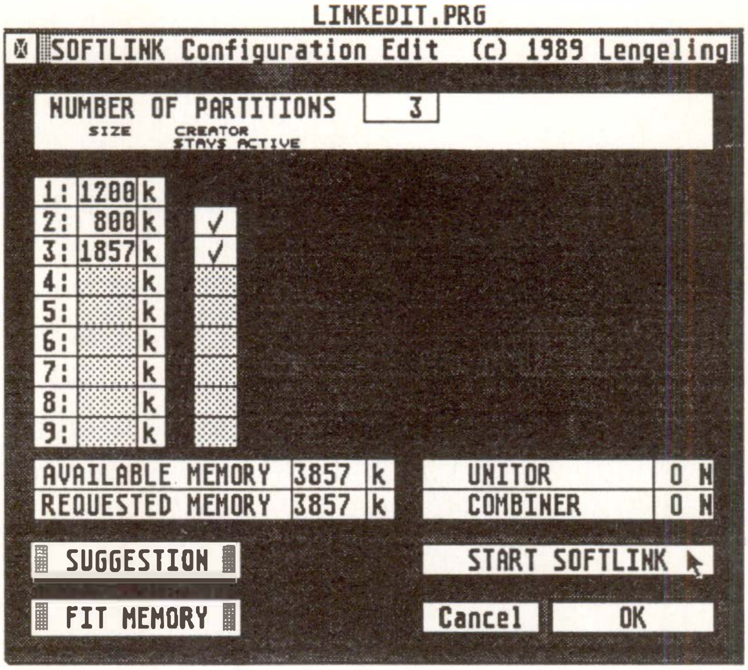
Before starting SOFT LINK for the first time, double-clicking "LINKEDIT.PRG" on the program disk allows you to define RAM allocation, number of partitions and hardware (UNITOR or COMBINER).

If NOTATOR SL or CREATOR SL are already running, you have to power down before accessing "LINKEDIT.PRG".

Do not omit to define your hardware configuration. Clicking "OK" or "START SOFT LINK" will store all the details.

The last partition defined (the one with the highest number) will receive any spare memory not yet allocated, so the size value should be seen as a minimum. If there is not enough memory left for that partition, LINKEDIT will automatically end the process after a warning notice and store the details.

LINKEDIT.PRG



Explanation:

Creator Stays Active determines whether CREATOR remains active when that partition is active. You should switch this off for a partition containing a program that is not SOFT LINK compatible to avoid causing problems to the system.

Available Memory shows the number of K-bytes free in the RAM.

Requested Memory shows the K-bytes used by the partitions.

Fit Memory fits the request for RAM according to what RAM is available by adapting or removing the last partition.

Suggestion suggests a way of distributing the memory to all requested partitions, which you can of course alter.

The last two functions do not make sense if used after SOFT LINK has been started because LINK-EDIT can only recognize the overall memory that is available at a new start, not the available memory in current partitions. How many kilobytes per partition you need depends on how much you think you will need for the particular program you are using. The minimum size is around 300 KB. In partition 1, CREATOR should have at least 900 KB and NOTATOR at least 1200 KB (unless you are using the Atari SLM 804 laser printer, in which case at least 2200 KB should be reserved).

As a rule, fewer but larger partitions are recommended: the remaining ones should receive around 1100 KB. Graphically-oriented editor programs usually need quite a lot of RAM, pure text programs such as Word Plus need less. Accessories should be used with care since they use up valuable memory.

4.1 Examples of configurations

2 MB ST/CREATOR:

2 partitions:	1: 1100, 2: remainder (?800)

4MB ST/CREATOR:

3 partitions:	1: 1400, 2: 1200, 3: remainder (?1200)
4 partitions:	1: 1100, 2: 1000, 3: 1000, 4: remainder (700)

2MB ST/NOTATOR:

2 partitions:	1: 1200, 2: remainder (?700)

4MB ST/NOTATOR:

3 partitions:	1: 1500, 2: 1200, 3: remainder (?1100)
4 partitions:	1: 1200, 2: 1000, 3: 1000, 4: remainder (600)

4MB ST/NOTATOR/Atari laser printer

2 partitions:	1: 2500,	
	2: remainder (?1300)	
3 partitions:	1: 2200,	
	2: 1000,	
	3: remainder (?600)	

5. SOFT LINK and compatibility

Compatibility is vital to a pan-program system such as SOFT LINK; since common hardware (Atari) is used, it is important that a common standard be adopted. There are two ways of approaching this question: you either make use of an established standard, or attempt to introduce a new one. With an established standard, compatibility is by definition, obvious. A completely new data format, on the other hand, once established, has the advantage of offering a fresh solutions to new requirements.

SOFT LINK, with its three-Level hierarchy, combines the best of both worlds through evolution rather than revolution. Levels 1 and 2 use, modify or replace the existing Atari operating system to be found in every ST computer: that way, programs that already conform to this existing standard are immediately compatible, without any need of modification. Level 2 is already capable of fulfilling most demands required of a pan-program system, such as Multitasking and the internal routing of MIDI. In principle, therefore, all kinds of editor programs are capable of running in SOFT LINK, without any particular limitations.

Trials have shown that at the time of going to print, almost every program tested started and could be operated in SOFT LINK. Non-MIDI programs such as word processors and graphic drawing programs present no problems. The MIDI Output of many MIDI programs works without a hitch. What became clear, though, was that there were frequent problems of compatibility with MIDI In routines. These programs need a (normally very small) modification to get them to make use of the existing operating system *(see the section for Programmers below).*

This general problem was touched on above: one computer is used by several programs, and it is clear that the hardware components themselves cannot be physically duplicated. Conflicts can therefore appear if programs reserve individual parts of the hardware for themselves, or if there is no operating system routine that can coordinate a quasi-simultaneous usage. A graphic example would be two watch faces which both run off the same mechanism, but which both have to tell a different time and run at different speeds. The problem is basically solvable so long as the requirements regarding the display of these two times of day are met by a negotiated solution.

This watch face example is similar to the problem which confronts SOFT LINK: no matter how precise within itself a type of software that generates its time axis from the computer hardware is, it does not imply that it will be immediately cooperative with other programs of the same type. We are here mainly talking about software with sequential Hfunctions, such as MIDI sequencers, mixdown automation, algorithmic composers etc, or non-MIDI applications such as modem programs.

The internal synchronization of these sorts of programs can be made to happen through the use of special internal formats and routines only. In order to make any compatibility applicable as universally as possible (ie not just for the products of one manufacturer), a common approach must be adopted as regards the development of a future standard. SOFT LINK Level 3 already offers routines that enable, amongst other things, internal synchronization. The aim is to unify the data protocol of as many manufacturers as possible, to adjust and adapt the internal data format and thereby to bring about a universal standard. At the time of writing, all this is just starting, and is bound to take time to come to fruition.

6. Programmers: Welcome Aboard!

Wherever possible, SOFT LINK uses, alters or replaces the Atari system calls. When calling these routines (some BIOS/XBIOS traps) you are in fact calling SOFT LINK which expects the same parameters as the original routines. This means that programs that are capable of running with the original operating system can run with SOFT LINK without any special modification.

SOFT LINK Level 1: accessory DIRECTOR alters the following system routines: Bconout(3); and Midiws();. Depending on the routing selected in DIRECTOR, MIDI data is sent to the physical ports original Atari (A), EXPORT (B,C,D) or UNITOR (E,F).

SOFT LINK Level 2: is built-into CREATOR SL and NOTATOR SL. Several partitions with standard desktops including GEM, VDI, GEMDOS are completely emulated. Programs can be started in each partition. Partitions are changed by SOFT LINK without the need for quitting or reloading programs. All realtime functions of CREATOR SL are active all the time (Play, Record, MIDI Thru, SMPTE Sync, MIDI communication).

These operating system calls are replaced: Bconout(MIDI); Midiws(); Bconin(MIDI); Bconstat(MIDI); and Xbtimer(TIMER_A).

The MIDI data of both transmit routines is internally and logically correctly merged both with the sequencer's transmit data and any data that arrives at the MIDI Inputs; it is sent to the MIDI Outputs according to the selected routing and internally displayed where appropriate. Both MIDI receive routines take account of the already logically-correctly mixed data stream of all physical Inputs (which includes UNITOR) and pass them to the caller. The MIDI interrupt vectors may not be altered.

CREATOR SL and NOTATOR SL need Timer A. Timer A is therefore NOT available to other programs. If a program installs a Timer A interrupt routine via a Xbtimer(), SOFT LINK will periodically call this routine using the same stack structure as it would if called by Timer A directly.

Timer B is not used by SOFT LINK. Timer D is used for RS 232-EXPORT (baud rate). You may install routines in VBL slots.

SOFT LINK Level 3: offers new functions which are independent of the Atari operating system. Write to C-LAB Software for more information.

There is a simple test to see if SOFT LINK (Level 2 or 3) is installed in the computer (in "C"):

if (xbios(27778) = = 15200259L) /* Yes, Soft Link is there! */

It is not absolutely necessary to check for SOFT LINK's presence. If it is there, you may draw the following conclusions:

1. It is not necessary to increase the TOS MIDI buffer. No harm comes of doing so, but it wastes memory.
2. MIDI Thru functions should be completely switched off, to prevent a multiple output of data.

30. Appendix

30. Appendix

1. Some CREATOR and NOTATOR concepts

1.1 "Playback" versus "event-altering" functions

CREATOR and NOTATOR functions can basically be divided into two types:

1. "Event-altering" functions that alter events in the computer's memory. Because of this alteration, the result of using an "event-altering" function can be seen in the event editor. The result of using an "event-altering" function can be reversed by using the function to do the opposite, but sometimes even this is not possible: it depends on the function, on its complexity, and on the scale of the alteration that was made.
   Most "Event-altering" functions are available as menu options *(see Chapter 6: "TRACKS", section 4 "When track parameters can be "event-altering"", Chapter 18: "COPY, MERGE, ...", Chapter 19: "EVENT-ALTERING FUNCTIONS", Chapter 24: "TRANSFORM")*. And naturally, when you use the event list and any of the editors, you are "altering" events.
2. "Playback" functions that do not alter events in the computer's memory, but alter them as they pass, "live", through the MIDI Outputs when they are played. Because of this, the result of using a "playback" function cannot be seen in the event editor (the event editor can only show what is in the memory).

"Playback" functions have the advantage of being immediately reversible, with the guarantee that the original data has not been touched.

As many functions as the computer allows are "playback" functions. Every visible value on the main page is a "playback" function *(QUANTIZE and GROOVE excepted - see Chapter 17: "QUANTIZE, ...")* including the arrange mode. The overall ease of handling of data in the arrange mode and the resulting reduction in the use of memory are other advantages of "playback" functions *(see also Chapter 6: "TRACKS", Chapter 20: "ARRANGE MODE" and Chapter 23: "REALTIME MIDI FUNCTIONS").*

1.2 What can be recorded?

All MIDI Voice (Channel) messages (Note On, Note Off, Pitch Bender Change, Channel Pressure, Poly Pressure, Control Change, Program Change) and System Exclusive *(see Chapter 8: "TYPES OF EVENT").*

MIDI System Realtime and Common data cannot be recorded but is received, processed and transmitted (MIDI Clock, START, STOP, CONTINUE, and SONG POSITION POINTERs etc).

1.3 Automatic Timing Control and "Overflow"

The greatest advantage of MIDI over previous interfacing systems lies in its ability to interface diverse musical devices with relatively few problems, and in its wide acceptance among musicians. MIDI is a very fast sequential computer interface, although for certain applications not fast enough.

If a MIDI set-up includes a lot of instruments where a vast number of notes and other events are playing (especially where pitch, modulation and pressure information is involved), the limitations of the MIDI protocol start to be noticed.

The best policy is therefore to manage data as efficiently and carefully as possible. Even under the heaviest of loads, however, CREATOR/NOTATOR will not be beaten. The correct data sequence is constantly analyzed: the program independently sets priorities and plays all data with the greatest possible speed. If the program has to transmit vast quantities of data, then there may be tiny delays in computer keystroke reaction times or in the screen display.

The "Overflow" box (below the pattern window) is a visual way of monitoring any discrepancy between the strict internal clock and the actual time position of the note (the "should be" and "actually is" times). The actual time position will always catch up with the "should be" time position as soon as any discrepancy has appeared. These discrepancies can occur, for instance, when a SysEx message of some length is inserted within a playing piece (which should be avoided if possible). Short blips in the box can be ignored. If the beam goes speckled, there was probably a perceptible delay, but this only happens if you are overburdening the system.

1.4 "Play Algorithm"

The "Play Algorithm" function optimizes the timing in the playback of existing events by ensuring notes get priority if ever there is the possibility of any delay during a heavy load. It should always be left switched on, in the "Flags" menu.

1.5 "Data Reduction"

Additionally to the Automatic Timing Control and Play Algorithm functions, the program conducts a reduction of data after independent analysis of certain musical criteria. By carefully removing certain non-note data, it ensures that the result will not be heard, but that the load is taken off the MIDI system.

For certain applications, "Data Reduction" ("Flags" menu) may need to be disabled, eg certain mixing desks use MIDI to control muting, and all the data must be present.

1.6 Clock "Interpolation" in "MIDI Sync" mode

The standard MIDI Clock's resolution is just 1/96th note, but the program is able to retain its much higher 1/768th (1/1536th) note resolution in "MIDI Sync" mode.

This is done by introducing or "interpolating" its own Synchronization reference points between the incoming Clock pulses: the program constantly measures the distance between two received MIDI Clock pulses, calculates the tempo, and by setting its own 1/768th pulses between the MIDI Clock's pulses, can transmit notes very accurately at the required time positions.

1.7 One note: two events

The MIDI protocol defines a note consisting of two separate events: a Note On event and Note Off event. Although this division is very handy for a computer, it does rather contradict the musical idea of a "note".

However, CREATOR/NOTATOR as far as possible give the impression of the note being complete. Every function including the copy functions include the Notes Off without input needed from the user: Note On events always include the Note Off event. This may clearly be seen in the event list, where the program automatically calculates the difference in the time positions between the Note On and Note Off and displays the difference (the note's length) in bars, beats etc. Whenever you change a note's length, what you are doing is in fact moving the Note Off event in time. So you never need to see Note Off events, which is why they are filtered out of the event list display.

The division between the two events does not usually cause any confusion. The two events are related by their common MIDI Channel and common pitch. This relationship is perfectly clear so long as a Note On has a corresponding Note Off at some point; this will always be the case when you are playing a keyboard because (think about it!) you cannot play a key a second time without having let go of it first.

This situation changes when you hook up a MIDI sequencer, because a sequencer will allow you to do anything by editing and the use of complex functions. The flexibility of being able to manipulate, for example, single Note Off events means that the situation could arise where you have moved a Note Off to a point where you have two Note On events sharing the same MIDI Channel and pitch, followed by two Note Off events.

This situation is not covered by the MIDI protocol: do the first Note On and first Note Off belong together, and the second Note On and second Note Off belong together, or is it vice versa? Or does the second Note On nullify the first Note On, or will the second Note On just be ignored? Different MIDI devices react differently in this grey area. In practice the aural effect of such a situation is difficult to spot, since the musical changes that ensue are slight and normally amount to a "legato" effect where none existed before.

The program's event editor recognizes the above situation and prevents it from arising in the first place. You will not be able to increase the duration of a note beyond a certain length: this maximum length is determined by the point at which increasing the length any further would cause the Note Off to overlap an existing Note of the same MIDI Channel and pitch.

1.8 Resolution: display in notes or pulses per quarter note?

In CREATOR/NOTATOR we talk about the smallest unit of time being a 1/768th note or 1/1536th note. Some people prefer to talk about resolution in terms of "pulses per quarter note" or "ppq": they divide the whole note by the four quarter notes.

So, in these terms, CREATOR/NOTATOR's highest resolutions are 192ppq (1/768ths) switchable to 384ppq (1/1536ths). MIDI Clock's resolution is 24ppq (1/96ths).

1.9 Values: "Inclusive/ exclusive"

Everywhere in the program, without exception, the beginning (or "lower", "left", "from") value of a zone or segment always includes that value in the calculations: the value is said to be "inclusive".

The end (or "upper", right", "to") value is never included in the calculation: the value is said to be "exclusive".

Example 1: "copy a segment from "1 1 1 1" to "5 1 1 1"" means "copy the first four bars" (the "to" value is not included).

Example 2: the Transform condition "delete all notes from C3 to C4" means "delete all those notes but not the C4's".

2. "Kill Score"

Pressing 'Shift-Q" on the main page opens a dialog box, asking whether you wish to "Kill Score Program". Clicking "KILL" gets rid of the score editor without harming any data. Use this in an emergency if you need more memory space. To retrieve the score editor, reload the complete program.

3. Notation display "Pseudo" events

58:	Guitar Tabulature.
59:	Chord Symbol
60:	Text
61:	Lyrics
62:	Dynamic signs
63:	Segno
64:	Slurs
65:	Crescendi
66:	Trills
67:	User Accents
68:	Repeat Bar
69:	Rests of more than one bar
70:	Space left of note
71:	Space right of note
72:	Space either side of note
73:	Arpeggio
74:	Tempo sign
80/81:	Clef change upper/lower stave
82/83:	Key change upper/lower stave
84:	Format Part (Page Preview)
85:	Format Score (Page Preview)

4. Notation display parameters and their effects

Effect	Parameter
whole song	Sloping beams "Minimum distance" Alternative 4/4 and 2/2 symbols Slur thickness

Effect	Parameter
global	Time signature
per track	Key signature Clef Display format or quantization Overlap Correction mode Rest Correction mode Interpretation mode Vocal Mode (no beams) Stem direction Stem hide Split stave/Split point Empty stave Miniature stave Polyphonic Mode Mapped Drum Mode
regional	Key signature change Clef change Time signature change
local	Enharmonic shift Note heads Beaming Syncopation display Stem direction Stem hide Graphical microshifting of notes Tuplets Force accidental Accidental distance

5. Glossary of terms used in manual

Absolute: the time shown is the correct value, it is not relative to any offset time, so no need to make mental compensations, eg "Global Positions" ("Edit" menu) shows events' time positions in the event editor in absolute terms: the times are shown relative to the "1 1 1 1" of the whole program. *(See Chapters 5: "POSITIONING", section 1.4 "Position/length displays in absolute units of time" and 20: "ARRANGE MODE", section 13 "Global position".)*

Alert box: a message which automatically appears on the screen to warn you of something, eg if you try to delete the last remaining entry in the arrange list, you are told you cannot do this.

ASCII: the representation of numbers in the form of an internationally-agreed set of symbols *(see Chapters 9: "EVENT EDITOR", section 9 and 14: "SCORE PRINTOUT", section 7.5).*

Byte: part of a MIDI event *(see Chapters 4: "DEFINITIONS", section 1, 8: "TYPES OF EVENT" and 9: "EVENT EDITOR", section 4).*

Calculator Keypad: the block of keys on the right of the computer which looks like a calculator.

Checksum: certain MIDI devices require SysEx Checksums to ensure that transmitted data is correct. The RMG does not transmit Checksums *(see Chapters 8: "TYPES OF EVENT", section 6.7 and 22: "REALTIME MIDI GENERATOR", section 11.5).*

Current: as in "current track/pattern/event" etc. The item which is under the cursor.

Cursor: the black rectangular box which moves about the screen highlighting values, parameters etc. For example, the track cursor shows which is the "current" track by moving up and down the pattern window; the event list cursor highlights various parts of an event, etc. Values under the cursor may be altered by using the '+'/'-' keys. In the score editor, the cursor makes the current object blink on and off.

Data byte, first/second: a MIDI event consists of three "bytes" or parts. The "status byte" is the first of the three and contains information on the event's own Channel and its "Status" (what it is, Note, Control etc). The "first" and "second data bytes" (which, confusingly, are the second and third bytes of an event!) tell us more about the status (eg, if it is a Note, what the pitch is and its velocity). If you take time to understand this simple concept, you will find the event list and "Transform" function easy to work with. *(See Chapters 8: "TYPES OF EVENT", 9: "EVENT EDITOR", 24: "TRANSFORM".)*

Default: the setting which the program comes set to; the "resting" value, eg the program defaults to the "768" internal clock resolution, though you may choose "1536".

Dialog box: these are produced by some functions in the screen, and they ask you to do something, eg clicking the "EDIT" icon on the main page when the cursor is on an empty track produces a dialog box which asks whether you wish to create a new track.

Event-altering: a function which changes the bytes of an event in the computer's memory, eg "Process Data". *see Chapters 19: "EVENT-ALTERING FUNCTIONS", 30: "APPENDIX", section 1.1 "'Playback' versus 'event-altering' functions".)*

External Sync: synchronizing to a external source of timing information such as a "SMPTE-to-MIDI" tape synchronizer. *(See Chapters 26: "SYNCHRONIZATION" and 27: "UNITOR ...".)*

Format: the "FORMAT" value in the "Information Bar" sets the screen quantization. To "Format" a disk is to prepare it to take information. *(See Chapter 11: "SCORE DISPLAY", section 9 "Quantizing the display".)*

Function: a process that carries out a number of commands on a number of events simultaneously, instead of you having to change each individual event manually, eg "Transform".

Hexadecimal: calculations based on base 16, used by professional MIDI and printer programmers *(see Chapters 9: "EVENT EDITOR", section 9 and 14: "SCORE PRINTOUT", section 7.5).*

Icon: an on-screen representation of a switch, button etc that does something in the program.

Inclusive/exclusive: *(See Chapter 30: "APPENDIX", section 1.9 "Values: inclusive/exclusive".)*

Information bar: the bar full of information that sits over the top of the main page and the event editor. Contains the Main Bar Counter, time signature, "Sync" mode etc.

Input: also called the "MIDI In port", this is where the MIDI cable is attached which brings MIDI data into the program.

Locator: a position which marks the start or end point of a process, Cycle etc. *(See Chapter 5: "POSITIONING", section 5 "Cycle mode, Locators and Autolocator".)*

MIDI Thru function: passes incoming MIDI data immediately back to the Output, and can simultaneously transpose, re-Channelize etc the data passing through. *(See Chapters 6: "TRACKS", 23: "REALTIME MIDI FUNCTIONS".)*

Memory: see RAM

Menu: along the top of the screen is the "menu bar", which contains "menu headings", each of which contain a list of "menu options", each of which carry out a function, open a function window, etc.

Mode: a state, as in "when you are in "Insert mode", any change you make to an event's time position in the event list will affect all the subsequent events' positions as well".

Multitasking: the ability of the program to do more than one thing at once, eg you may load a song while the program is in Playback mode.

Offset: a time position which is relative to the beginning. Example: in the arrange list, if a pattern starts at bar 5 it is said to be offset by 4 bars from the beginning of the song.

Output: also called the "MIDI Out port", this is where the MIDI cable is attached which transmits MIDI data from the program.

Parameter: a value which is part of a function or part of the program, eg a track has a number of parameters which it can use to affect the events inside it. These track parameters include "CHANNEL", "TRANSPOSE" etc *(see Chapter 6: "TRACKS").* These track parameters are "Playback" parameters (see below).

Partition: in SOFT LINK, the memory of the computer is divided up into partitions, each of which represents a separate computer, and into which programs are loaded. *(See Chapter 29: "SOFT LINK ...".)*

Playback Parameter: a function which affects events as they are transmitted from the Output without changing the bytes of the events themselves in the memory. *(See Chapters 6: "TRACKS", 30: "APPENDIX", section 1.1 "Playback" versus "event-altering" functions.)*

Port: the physical sockets in the computer, UNITOR, EXPORT etc to which are connected the MIDI cables, printer etc.

Pseudo events: are events unique to the program which deal with certain internal processes, eg tempo, muting, score symbols etc. They are not transmitted from the program with MIDI events. *(See Chapter 8: "TYPES OF EVENT", section 7 "Pseudo (P_USER) events".)*

Pulse: the internal clock's smallest unit of time. *(See Chapters 5: "POSITIONING", section 2 "Resolution", 30: "APPENDIX", section 1.8 "Resolution".)*

RAM: the computer's Random Access Memory which temporarily stores all the data while you are working. The RAM's contents should be periodically saved to disk as its data is erased if power is interrupted. *(See Chapter 1: "INTRODUCTION", section 3.1 "Hardware".)*

Realtime: (1) a process which can be conducted while the program is running is being conducted in "realtime", eg changing of tempo using the pitch wheel can be done in realtime without stopping the program. (2) the name given to the internal clock's highest resolutions 768 and 1536.

Resolution: the degree of control the program allows over events' time positions. The program has a highest resolution of 1/1536th notes. *(See Chapters 5: "POSITIONING", section 2 "Resolution", 30: "APPENDIX", section 1.8 "Resolution".)*

SMPTE: is a universally-adopted timecode which locks two systems together and tells the slave system exactly where the master system is. *(See Chapters 26: "SYNCHRONIZATION", 27: "UNITOR...".)*

Scroll: to change a value with the mouse, eg to scroll a value on the screen, place the mouse pointer on it and press-and-hold a mouse button. *(See Chapter 3: "GENERAL HANDLING, section 1 "Mouse".)*

Scrollbar/box: part of the Atari GEM environment. Various parts of the program have a scroll bar, including Hyper Edit, the score editor, the event editor page and the Item/File Selectors. The scroll bar allows you to show an earlier/later part of the function by clicking inside it or dragging the white scroll box inside the bar, where the bar represents the overall function, and the box the screen segment visible.

Segment: part of a track, eg "3 1 1 1" to "9 1 1 1" is a 6-bar segment.

Status: every MIDI event has a status which determines what type of event it is, Note, Pitch Wheel, Aftertouch etc. *(See Chapter 8: "TYPES OF EVENT".)*

Typewriter keypad: the main keypad on the computer.

VITC: Vertical Interval Timecode, inserted between video frames, allowing NOTATOR/CREATOR to lock to video via STEADY EYE even if the video is in "slow motion" or "freeze-frame" mode.

31. Index

31. Index

Chapters are shown in bold type, followed by the relevant section eg for "Aftertouch" look in Chapter 8, section 4.

Information relating to NOTATOR is picked out in red.

CAPITAL LETTERS indicate the item is displayed in capitals on the screen.

(m)	=	menu option
(IB)	=	Information Bar
(TP)	=	Track Parameter
(K)	=	Key
(PM)	=	Parameter Mode window
(EE)	=	Event Editor

Key Commands

MAIN PAGE

Adaptive Groove parameter window	Alternate A
Arrange Autolocatorrecall	Alternate 0-9 (T)
Arrange Autolocator store	Shift Alternate 0-9 (T)
Arrange catch mode: arrange cursor moves with song	L
Arrange catch mode disabled: arrange cursor freeze	Shift L
Arrange cursor move, not affecting Main Bar Counter	F1 & F2
Arrange cursor move: affects Main Bar Counter	( ) (C)
Arrange entry: duplicate to next arrange chain	Insert
Arrange entrydelete	Delete
Arrange entryname	ShiftEsc
Arrange mode on/off	A
Arrange mute: copy to all following entries	Shift U
Arrange mute: copy to next arrange entry	U
Arrange pattern's start/end locators loaded+CYCLE	X
Arrange transpose: copy to all following entries	ShiftT
Arrange transpose: copy to next arrange entry	T
Arrange Upbeat: copy to all following entries	Shift B
Arrange Upbeat: copyto nextarrangeentry	B
Autodropmode on/off	D
Autolocator: recall positions	F3-F10
Autolocator: storepositions	ShiftF3-F10

CHANNEL name: press 'Clr Home' first	Esc
CHANNEL track parameter: place cursors on it	Clr Home
Continue from Main Bar Counter position / Pause	
Cursor: move around main page	Cursor l/r
Cycle Mode on/off	C

Delay in milliseconds display	Alternate D
Drop-merge: enters record mode without Start	Space
Dynamic Groove: applies more with every keypress	V

Event Editor	E
Event editor dialog box: initialize	Shift J
EXPORT initialize	ShiftJ

Fix track's Quantize or Groove	F

Groove: "Do Groove"; apply current Groove to track	G
Groove parameter window	Alternate G

Hide cursored track	H

Load song: opens File Selector	Alternate L

Macro function record/stop	Alternate Spacebar
Main Bar Counter: open for direct typing	
Main Bar Counter: scroll by bar	[ ]
MIDI reset (not Volume), All Notes Off	Help
MIDI Reset On First Stop: for synths that need it	Shift Help
MIDI Thru function: copy cursored track's params	\ (USA)
MIDI Thru function: copy cursored track's params	# (GB)
Mixdown: demix tracks in pattern by Channel	Alternate ,
Mixdown all tracks in pattern	Alternate M
Mouse becomes fader when pointed at a value	Control
Mouse buttons swap	Shift Z
Mutes: recall mute groups	Alternate F3-F10
Mutes: store mute groups	Shift Alternate F3-F10

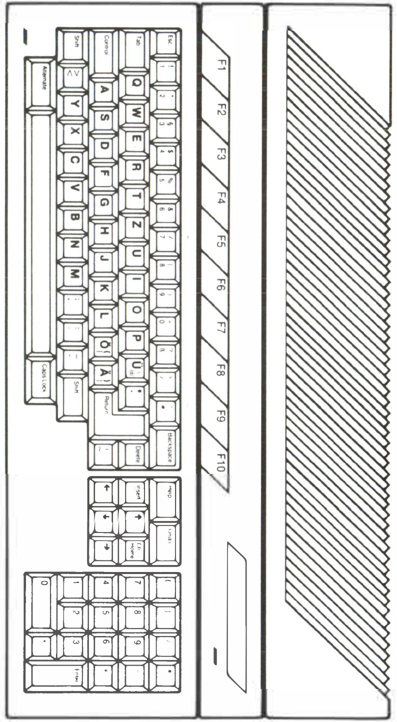
Normalize tracks "playback" parameters	N
Notepad window	Alternate N

Pattern name (also force-names arrange listing)	Shift N
Pattern select 0 to 99	0-9 (T)
Process Data window	Alternate P
Punch mode activated, ready for Punch-Delete + DROP	/ (C)

Quantize: "Do last selectedQuantize"	Q

Record-delete with count-in	* (C)
Record-merge	R
Record: "buffer record" puts contents into track	Shift Return
RMG window	M

Save Song: opens File Selector	Alternate S
Score Kill (NOTATOR)	Shift Q
Segment Copywindow	Alternate C
SMPTE: Position-in-framesdisplay	Alternate Y
SMPTE Sync Reference create: Internal SMPTE Learn	Shift W
SMPTE Sync Reference window	S
SOFT LINK: select partition	RightShift 1-9 (C)
Solo track on/off	O
Start	0 (C)
Stop	Enter
Stop / "OK" or "EXIT" windows	Return
Sync mode select	Y



Key Commands

Tempo Interpreter window	Alternate I
Track: copy to new location via 'Return'	Shift C
Track delete	Backspace
Track initialized	Shift Backspace
Track name	Shift Backspace
Track select	Curs.up/dn
Track select: 10 to 16	LeftShift0-6 (C)
Track select: 1 to 9	1-9 (C)
Transformwindow	AlternateT

Undo previous event-altering operation	Undo

Value under cursor up/down	+ /- (C)
Value undercursor up/down in 10's	Shift + / - (C)

EVENT EDITOR

Adaptive Groove parameterwindow	AlternateA
Arrange mode on/off	A
Autolocator: recall positions	F3-F10
COMMENT naming byway of event "extention"	Shift Esc
COMMENT on/off	Shift C
Continue from Main Bar Counter position / Pause	[illegible]
Cursor: move within event line	Cursor l/r
Cycle mode on/off	C
Delete event marked for deletion; then 'Space'/'E'	Delete
Delete events NOT of same type: "fast keep"	Shift Alternate .
Delete Delete same type of event: "fast delete"	Shift Delete
Deletes events marked for deletion by 'Delete' key	Spacebar
Fast Transform: copy this event value adding 1	Shift Alternate T
Fast Transform: copy this event value to all following	Shift T
Fast Transform: copy this event value to next one	T
Graphic display in event list on/off	G
Groove: "Do Groove"; apply current Groove to track	Shift G
Hexadecimal display on/off	Shift Alternate $
HyperEdit open/close	J
Hyper Instrument definition from the event list	Shift J
Hyper parameters window open/close	Alternate J
Insertmode on/off	Shift I
Inserts MIDI Control event into event list	Insert
Inserts note event intoeventlist	Shift Insert
Locators: first/last event times in Segment Copy etc	F1 & F2
Macrofunction record/stop	Alternate Spacebar
Main Bar Counter: open for direct typing	[illegible]
Main Bar Counter: scroll by bar	[ ]
Main Page	E
Main page / "OK" or "EXIT" from windows	Return
Matrix Editor open/close	K
Matrix editor zoom in	Shift Z (USA)
Matrix editor zoom in	Shift \ (GB)
Matrix editor zoom out	Z (USA)
Matrixeditor zoom out	\ (GB)
MIDI Out on/off	Shift O
MIDI reset (not Volume), All Notes Off	Help
Pickup Clock: forces Main Bar Position onto event	/ (C)
Position: Catch mode cursor keeps up with events	L
Position:jump to first event in track	Clr Home
Position: jump to last event in track	Shift Clr Home
Position:scrollevent list by page	Shift Cursor up/down
Position: scroll event list up/down	Cursorup/down
Position: scroll Hyper Edit/Matrix editor in bars	( ) (C)
Position: scroll Matrix editor in small steps	Shift ( ) (C)
Position: start/stop sequence fromcurrent event	\ (USA)
Position: start/stop sequence from current event	# (GB)
Process Data window	Alternate P
Quantize: dequantize cursored event	Shift Q
Quantize cursored event	Q
Record-delete with count-in	* (C)
Score editor open/close (NOTATOR)	N
Segment Copy window	Alternate C
SMPTE: Position-in-frames display	Alternate Y
SOFT LINK: select partition	RightShift 1-9 (C)
Solo track on/off	O
Start	0 (C)
Step Input via MIDI: empty step or rest	Tab
Step Input via MIDI on/off	Shift K
Stop	Enter
Sync mode select	Y
Text P_USER 60 insert / edit existing text	Esc
Transform window	Alternate T
Undo changes & fix them at original values	Shift Undo
Undo changes since entering event editor	Undo
Value 0where 0 is first value (avoids starting)	LeftShift 0 (C)
Values for typing	1-0 (C)
Value under cursorup/down	+ / - (C)
Value undercursor up/down in 10's	Shift + /- (C)

NOTATION

Accidentals: Confirmation Accidentals on these notes	Shift Alternate H
Beam: restore auto-beaming to selected notes	Alternate B
Beam: un-beam selcted notes	Shift B
Beam selectednotes	B
Delete selected events	Backspace
Enharmonic shift down for selected notes	H
Enharmonic shift up for selected notes	Shift H
Enharmonisation: restores original	Alternate H
Extensions: delete those of selected notes	Shift Alternate E
Font change for selected Text/Lyric.	Alternate 1-8 (T)
Full score mode on/off	U
Global Display Parameters window	Shift X
Interpretation mode on/off	I
Lyric mode steps to next note/rest position	Tab
MIDI Channel 1-12 in partbox	Shift 1 to = (T)
MIDI Channel change forselected notes	Alternate 1 to 8 (T)
Miniaturize all staves in full score	Shift M
Miniaturize current stave on/off	M
Minimum width of space in bars: decrement.	Alt. Z (USA)
Minimum width of space in bars: decrement	Alternate \ (GB)
Minimum width of space in bars: increase in 10's	Shift \ (GB)
Minimum width of space in bars: increase in 10's	Shift Z (USA)
Minimum width of space in bars: increment	Shift Alt Z (USA)
Minimum width of space in bars: increment	Shift Alt. \ (GB)
Minimumwidth of space in bars: reduce in 10's	\ (GB)
Minimum width of space in bars: reduce in 10's	Z (USA)
Note value selection in partbox	1-6 (T)
Page Preview	P
Parameter Mode window: track's own display values	X
Position: Catch disable freezes score cursoron/off	Shift L
Position: scroll stave in bars	( ) (C)
Position: scroll stave in beats	Shift ( ) (C)
Position: scroll stave in display format units	Alternate ( ) (C)
Print: "quick print"	Shift P
Rest Correction mode on/off	R
Rests: convert selected notes into user-rests	Alternate R
Rests: hold while entering notes	Alternate
Split(double) stave on/off	S
Split Channels of notes by pitch: for Polyphony	Alternate S
Stem: restore auto-stem direction / hidden stems	Alternate D
Stem downfor selected notes	D
Stems: hide those of selected notes	Shift Alternate D
Stem up for selected notes	Shift D
Syncopation: alternative display	W
Syncopation: restore original display	Shift W
Text P_USER 60 enter / edit existingtext/lyric	Esc
Vertically aligns all following identical objects	Shift F
Vertically aligns next identical object	F
Vocal display: removes all beams	V

(T)	**Typewriter keyboard**
(C)	**Calculator keypad**
(GB)	**British keyboard**
(USA)	**American keyboard**